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ABSTRACT

This book contains 30 activities that the instructor can use to infuse architectural education into other studies, such as mathematics, language arts, social studies, and formal art education. Some general suggestions are offered for getting the teacher started. A chart relates objectives and infusion subjects to the activities. Following the chart is a sample activity in which important features are identified. A listing of suggested books and films is provided. The text of each activity is written to communicate desired concepts first to the instructor so that they can be effectively related to the students. The primary and secondary activity objectives are indicated for each activity. These components are also provided for each of the activities: procedure for activity execution, suggested subjects for activity infusion, suggested activities to reinforce or expand activity concept, people and places representative of the activity concept, key and related vocabulary, and a graphic activity illustration, work space, or historical structure. Sample concepts include measurement, problem solving, planning, environment, architectual models, two- and three-dimensional planning, elevation, windows, movement, seasonal change, natural and built form, pattern, texture, color, paper, modular structures, cities, cultural differences, "tops" (finishing structures), function, building materials, shape, tents, vocabulary, perspective, traffic flow, floorplan, and scale. (YLB)

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ARCHITECTURE: Building My World

13

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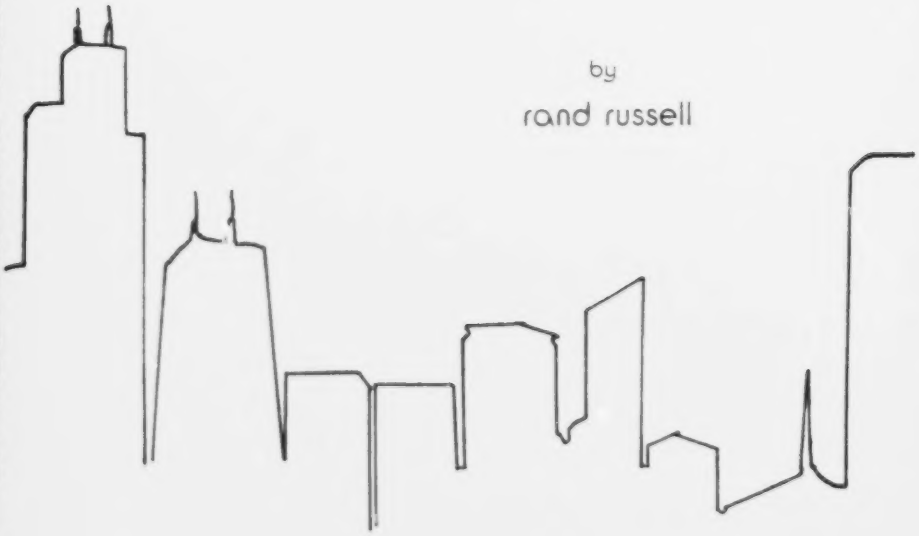
architecture:
building my world



by

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building their world: to the teacher

Our world, our environment, is to a great extent today the product of human imagination and need. Yet, our impressions of how and why this is accomplished tend to be of a random and incomplete nature. Considering current social and economic trends, it is of vital importance that the environment creators of tomorrow understand and appreciate not only their potential and tasks, but also their responsibilities.

Architects are one of the most visible environment creators. They are generally thought by most to be a breed apart; themselves and their creations shrouded in a veil of incomprehensible mathematics and engineering concepts. Although it is of course true that the study of architecture is necessarily lengthy and technical, architecture itself should be thought of as being accessible to all. We are all **consumers** of architecture not only occupying structures, but also making enormous expenditures to build and maintain architecture throughout our lives. An appreciation of architecture and intelligent consumers can result only with understanding. This book is one beginning — you are another. Bridging the gap between art and education, education and reality, and reality and responsibility this study will provide not only an exposure to architectural concepts, but also architectural consumer education; not an isolated exposure, but a study as integral and relative as those buildings in which we exist. The target for architectural enlightenment will be students who, like yourself, will someday work, live, play, and perhaps even survive within structures designed by architects, but financed, utilized, appreciated, and above all maintained by consumers.

In communicating the importance of architecture's role in our lives, its relevance can best be understood by exhibiting to your students its relation and integration with their other studies. Ideally, architecture as a subject would be presented within and without the formal art instruction process. In this manner it would be clearly evident that architecture is an applied art whose application and appreciation is dependent and interdependent upon other studies such as math, language arts, social studies, **and** formal art education. This method of presentation is referred to as infusion. Infusion is not only a useful tool for introducing desired concepts, but is almost unsurpassed in its ability to exhibit to skeptical students that their math, social studies, and language arts lessons do indeed have practical application. As an infusion subject architecture blends easily into the curriculum. The study of architecture requires courses in areas such as design, theory, graphics, and engineering, and also places emphasis on subjects such as mathematics, English, physics, the humanities, and economics. Therefore, it is apparent that the latter subjects can benefit and be supplemented by an introduction to architecture. Many classroom teachers may be reluctant if not unprepared to undertake what they consider to be an "art" subject within their classrooms and lesson plans. When, however, architecture is presented simply as the organization of space, removed from its usual connotation of "building" and based largely upon the study of the aforementioned subjects, it should be seen

as being less intimidating, more accessible, and indeed necessary and enjoyable to instructor and student alike.

Architectural materials can be targeted toward the youngest students. A kindergarten class out for a walk can, while passing various types of structures, discuss their difference in use, construction materials, and perhaps speculate about the types of people who utilize such structures. Returning to the classroom they may describe their homes referring to shape, color, outside details, and areas of differing use. Concepts as basic as inside/outside and the relationship between the two are perfect applications at this level. More mature students may come to appreciate concept development through writing and executing comic-strips, a wonderful application of sequencing, or by converting a two-dimensional drawing into a three-dimensional reality. Rather than students simply computing the area of a rectangle drawn in their math book, assign them the task of computing the square-footage within their classroom. Further, they may be able to determine the average amount of space per pupil within the classroom and then find information regarding state or federal requirements pertaining to such matters. In this way the architectural concepts to be presented are infused into your curriculum, and become integral and vital rather than isolated and seemingly unrelated. Architecture communicated in this manner can be shown to be not simply an applied art practiced by only a few, but rather a social and historically based phenomenon of vital importance to all.

The possibilities for architectural education are endless. It will develop skills such as abstract thinking, and the ability to receive, interpret, and utilize symbolic communication; the very skills your students require to read, to write, and to utilize mathematics. Few experiences in education can compare with a learning situation shared by the instructor and the student. An appreciation for the architect and the work and service he provides may not produce hoards of young practitioners, but perhaps knowing why and how that wall was constructed will lessen the inclination to write on it.

building their world: by the book

This unit is your delivery system. Equally important to the materials, however, is your application of them. No one knows your students' capabilities better, nor is anyone more knowledgable about presenting information to them, than you. All activities included in this unit, when adapted by you to suit your requirements, are capable of being utilized at all levels. These activities are not to be considered to be finite. Rather, they are intended to be supplemented and reinforced by your expertise and interaction. Your involvement is essential for their successful implementation. Don't be intimidated if you lack art experience. Visuals are provided for reproduction if you choose, and with the wealth of resources available you never lack illustrative material. The greatest, and least expensive, is your library. Most now participate in an inter-library lending service making almost any book available. The books and films listed at the end of this section are only a small portion of the numerous available. Utilize these visuals as they can imprint realism onto your students' study of architecture, people, and places.

If you wish to create new activities relevant to your needs, there are countless aids designed to assist you. Most can be obtained at office supply stores and include tools such as templates to aid in drawing all manner of graphics including shapes, architectural details, and lettering guides. Pressure-sensitive lettering can contribute readability and lend professional quality to your activities and is easily utilized. Tracing paper and photocopiers can produce useful visuals and you may utilize these techniques of reproduction without fear of copyright violations as your materials are intended for educational purposes. You **can** draw a straight line — use a ruler!

Familiarize yourself with the following pages. They will aid you not only by explaining the format of the unit, but will also aid in planning your method of presentation as they contain charts relating objectives and infusion subjects to activities. Utilizing this chart you may select an activity which relates to other curriculum materials under study. You may also select an activity whose objective satisfies those required by other studies, or you may choose an activity and build a lesson around it. Following the chart is a sample activity in which important features are identified. In addition a listing of suggested books and films is provided.

architecture: building my world is one beginning — you are another. Above all, keep in mind that there are no incorrect solutions to the activities; students will respond and create based upon their unique views and experience — allow them to teach you.

1 Select an activity for infusion which relates to desired objectives or study requirements. The text of each activity is written to communicate desired concepts first to you, the instructor, so that you can effectively relate them to your students. Study the key concept of the activity noting the primary and secondary objectives. Familiarize yourself with the activity, planning the delivery of the concept by relating the activity to your students, your needs, and your delivery techniques. Assemble all necessary resources, materials, and graphics including a reproduction of the activity illustration for each student. It will illustrate the concept, introduce the student to an historical structure, and in many cases provide the working surface for the activity. The symbols located in the lower left corner of the student activity sheet will also indentify the tools required for that activity.

2 Distribute the student activity sheet and initiate the project with discussion, research, and questioning based upon the concept and the vocabulary of the activity. Discuss the illustration and its relation to the concept or its historical significance. After noting the tools required for the activity discuss its relation to their study and provide them with any information necessary to initiate and complete the required task. Most activities may be completed in one hour or less, although you may wish to allow for more time for discussion or related activities and research.

3 Following the activity discuss the varied solutions your students will have created when presented with an identical task. Again discuss the relation of the activity and its concept to other studies and relate possible applications of the information and skills utilized. If you wish to extend the activity you may do so by assigning additional research and report-back-to-the-class topics.

infusion subjects a art s science m math l language arts

objectives

1.0 The student will be able to identify forms in the natural environment that relate to the built environment.

2.0 The student will be able to identify and attend to various visual elements of the environment.

3.0 The student will be able to visually portray three-dimensional reality and concepts in two dimensions.

4.0 The student will be able to identify and utilize various media and the effects they produce.

5.0 The student will be able to identify and utilize the required procedures for the conception and execution of a design.

6.0 The student will identify differences in cultures and the effects those differences have upon architecture.

7.0 The student will identify architectural design as a response to needs and desires.

8.0 The student will be able to identify natural and synthetic materials and their architectural and environmental applications.

9.0 The student will be able to design and create a three-dimensional model of a structure.

10.0 The student will recognize and identify the colors, spaces, and shapes which form the environment, and be able to manipulate them to create unique designs.

legend

3 0

4 0

4

The structures designed by architects occupy space, as does everything else in the environment including you. How everything relates within the total environment is a concern of the architect during the design phase of any structure. How humans will move through this space is also an important consideration. To facilitate this planning architects produce drawings of their structures in relation to the features of its proposed location as it would appear if seen from directly above. This allows them to communicate how the structure will relate to its surroundings, how people will utilize the space in and around the structure, and to plan possible future alterations to the structure and its environment.

This activity will require the students to communicate their experience and surroundings by translating them into a two-dimensional reality quite likely outside that experience.

ACTIVITY

After a discussion of the concept, the student will accomplish a listing of features which surround their homes. Imagining what their environment would look like if seen from a tall building or an aircraft, they will draw their home and its surrounding area as it would appear.

INFUSION SUBJECTS

ART LANGUAGE ARTS MATH

RELATED ACTIVITIES

—View actual site plans.
—Construct site models using the house from activity number 5 or 7.

PEOPLE AND PLACES

Richard Neutra
Philip Johnson
Frank Lloyd Wright

VOCABULARY

Environment

ILLUSTRATION: Rang House, Konigstein, Germany.
Richard Neutra

○	Primary Activity Objective
○	Secondary Activity Objective
1	Activity Number
CONCEPT	Activity concept related by opening paragraph
ACTIVITY	Procedure for Activity execution
INFUSION SUBJECTS	Suggested subjects for Activity Infusion
RELATED ACTIVITIES	Suggested Activities to reinforce or expand activity concept
PEOPLE AND PLACES	Architects representative of activity concept
VOCABULARY	Key and related vocabulary
ILLUSTRATION	Graphic activity illustration, work space, or historical structure

top view

suggested books

Ching, Francis. *Architecture: Form Space & Order.* New York: Van Nostrand Reinhold Company, 1979.

Foster, Michael. (Ed.). *Architecture: Style, Structure and Design.* New York: Excalibur Books, 1982.

Hofmann, W. and Kultermann, U. *Modern Architecture in Color.* New York: The Viking Press, 1970.

Jacobus, John. *Twentieth-Century Architecture: The Middle Years 1940-65.* New York: Frederick A. Praeger, 1966.

Norwich, John J. (Ed.). *Great Architecture of the World.* New York: Bonanza Books, 1981.

Raeburn, Michael. *Architecture of the World.* New York: Galahad Books, 1975.

suggested films

Alvar Aalto – A Finnish Architect

The Architecture of Japan

Danish Houses

A Legacy For Living

Man, Building, and Environment

The National Gallery Builds

A Place to Be: The Construction of the East Building of The National Gallery of Art

Places for People

A Wall – Jules Chapon

The above films are available from:

Educators Guide to Free Films
Educators Progress Service, Inc.
Randolph, Wisconsin 53956

activities

4.0

All

1

Quality design results when a designer properly utilizes both imagination and tools, and the development and sophistication of measurement has permitted accurate and efficient building, and the reproduction of structure and/or units of structure. It is, therefore, a skill to be mastered as a prerequisite to design and creative activity. Additonally, a working knowledge of measurement and the units of measurement will facilitate the student's ability to conceive of size and size relationships.

ACTIVITY

Following discussion of the concept, have the students detach the ruler illustration from the bottom of their worksheet. Their task will be to measure and record, to the nearest ¼", the distance between identically numbered points.

At lower levels an excellent introduction to this activity is to provide each student with a square of paper 1" by 1". Following a discussion of the units of measure ask them to fold the square in half, and then in half again. This will visually illustrate ¼", ½", and 1" units.

INFUSION SUBJECTS

ART MATH SOCIAL STUDIES

RELATED ACTIVITIES

—Measure and record various assigned items within the classroom.
—Measure and compute the square-footage of the classroom.
—Research government requirements regarding square-footage and facilities.

VOCABULARY

Straightedge
Standard Measure
Metric Measure

NOTE: At lower levels this activity may be utilized to reinforce numerical sequence concepts, and promote development of fine-motor skills.

1. 5. .2 .9 .4

10. 3.

.1 9 .7

.10 .3

.6

2. 7. 8 straight and narrow

5.0

10.0

2

The design process, especially as it relates to architecture, is sequential. Not only are the individual steps of the process important in and of themselves, their successful completion may be required before proceeding to the next phase of the process.

This activity is designed to require the student to attend to the various phases of a problem solving situation, and to communicate them in a clear and orderly fashion utilizing a visual rather than verbal format.

ACTIVITY

Following discussion of the concepts of sequence and problem solving introduce the activity by relating it to a comic-strip. Ask the students to carefully consider a specific task or activity and identify the various procedures or steps required in that activity. An outline may be helpful at this point. Next, they will communicate the procedure visually by drawing in a sequence strip format as depicted in their activity book.

INFUSION SUBJECTS

ART LANGUAGE ARTS SCIENCE

RELATED ACTIVITIES

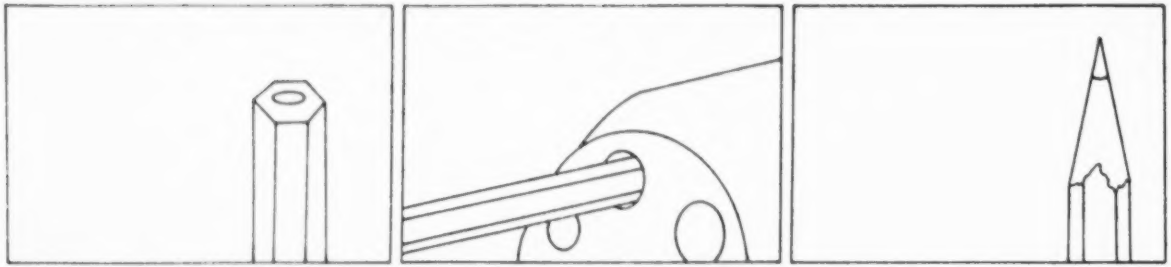
—Study possible applications of this type of communication (e.g. storyboards, printed instructions, comic-strips, etc.).

PEOPLE AND PLACES

Rube Goldberg
Charles Shultz

VOCABULARY

Sequence
Format
Procedure



as simple as 1·2·3

5.0

4.0

3

Planning is essential for the successful completion of any activity. It may involve assembling the necessary materials required for a task, as in a recipe, or be as complex as conceptualizing a structure which will fulfill requirements of need and desire, and planning for the construction process, completion, and finally occupancy. This activity is designed to reinforce the student's awareness of the importance of careful planning, and to provide them with experience in communicating visually through the use of line.

ACTIVITY

Discuss the necessity for careful planning before starting any activity, simple or complex, reminding the students that it can often mean the difference between success and failure. Introduce the example provided in their activity book, explaining that it was produced utilizing only one, unbroken and continuously produced line. Allow them to trace over the drawing to familiarize them with the concept and process. In the space provided, or on other paper, assign them the task of carefully planning a drawing and producing it from beginning to end without removing their pencils from the paper.

INFUSION SUBJECTS

ART LANGUAGE ARTS MATH

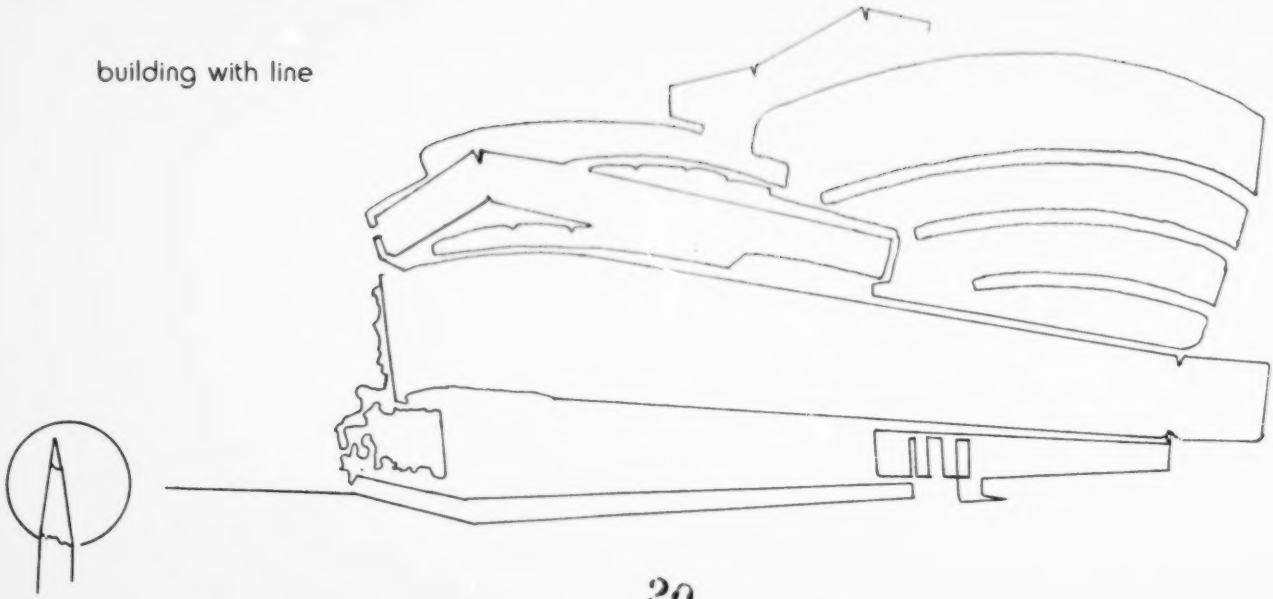
RELATED ACTIVITIES

—Work in teams to produce a mural composed of only one line.

—Write a short poem and illustrate it combining line drawing and cursive script.

ILLUSTRATION: Solomon R. Guggenheim Museum, New York, 1956-59, Frank Lloyd Wright.
Reinforced Concrete.

building with line



3.0

4.0

4

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INFUSION SUBJECTS

ART LANGUAGE ARTS MATH

RELATED ACTIVITIES

—View actual site plans.

—Construct site models using the house from activity number 5 or 7.

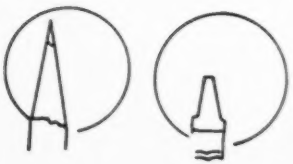
PEOPLE AND PLACES

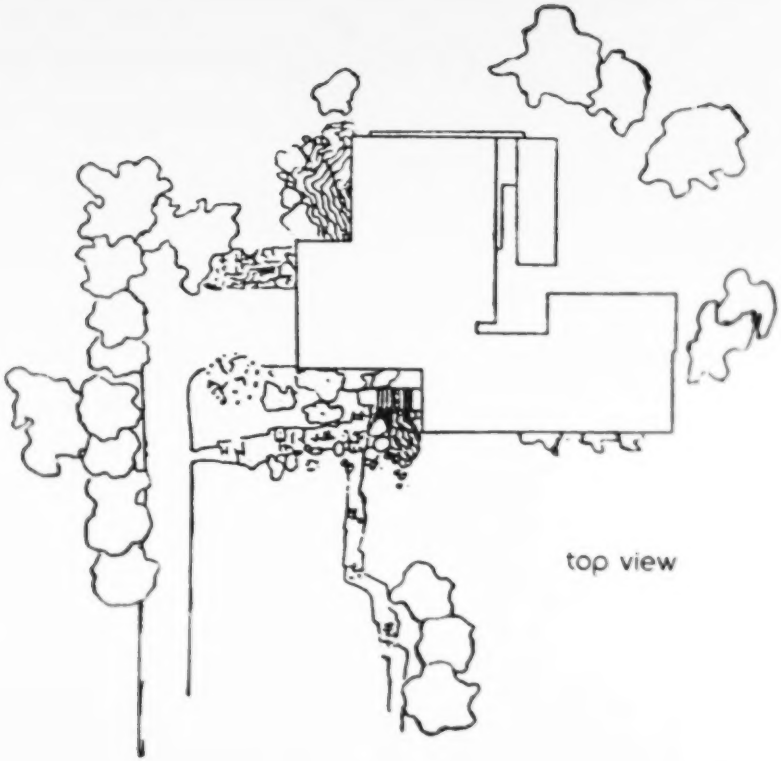
Richard Neutra
Philip Johnson
Frank Lloyd Wright

VOCABULARY

Environment

ILLUSTRATION: Rang House, Konigstein, Germany, Richard Neutra





top view

4.0

5.0

5

One way of communicating a proposed design is, of course, to produce an actual representation of the design. In the case of a proposed structure this is obviously impossible during the design stage. Instead, architectural models are constructed to scale and complete with all the details necessary to accurately communicate the designer's or architect's ideas to others.

For centuries Japanese architects have constructed architectural models in the beautifully straightforward manner utilized in this activity. This method illustrates the planning and design process in its entirety from initial concept, through two-dimensional planning, and finally results in a small, but accurate, three-dimensional reality.

ACTIVITY

After viewing and discussing the illustration, the students will plan, design and produce a structure of their own. The model may be produced in any size. The illustration in the upper-left corner of the student's activity sheet depicts the location of folds and cuts on a rectangular sheet of white paper. In the illustration, cuts appear as solid lines, and folds as dotted lines. The four perimeter rectangles must be of equal depth. All drawing and coloring must be completed prior to folding and assembly which is shown in the large lower-right drawing. The instructor may wish to pre-fold and cut for some levels.

INFUSION SUBJECTS

ART SOCIAL STUDIES MATH LANGUAGE ARTS

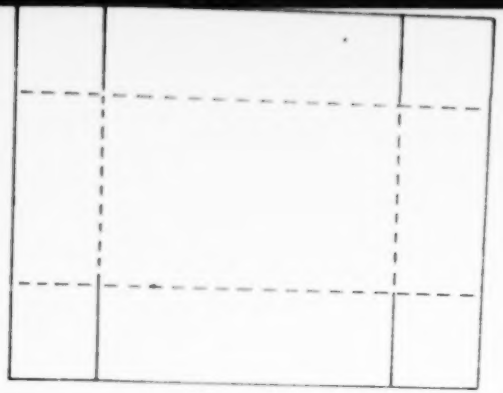
RELATED ACTIVITIES

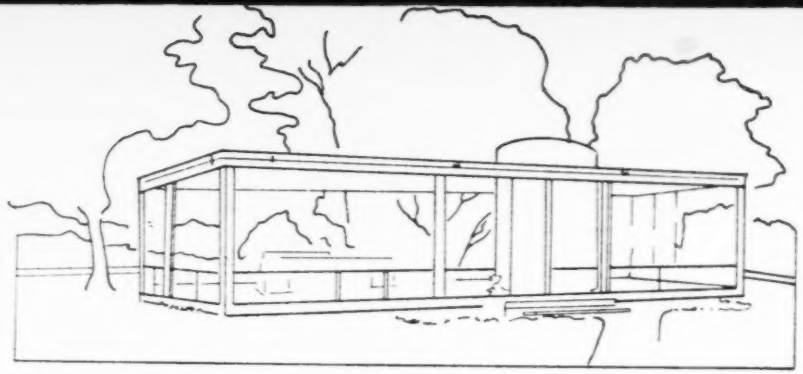
—Produce furnishings for the interior and landscape the exterior.
—Study Japanese methods and drawings.
—Study other methods of creating architectural models.

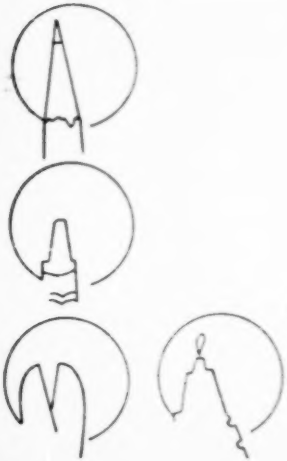
VOCABULARY

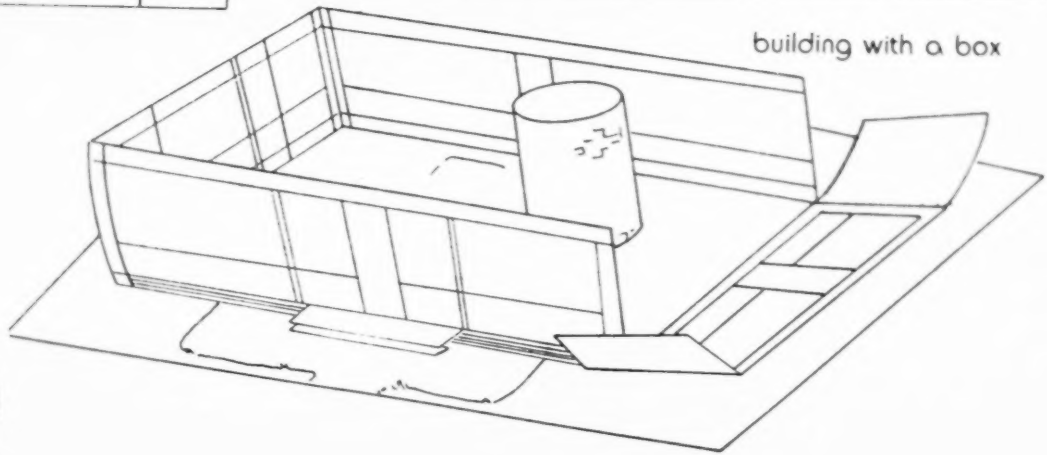
Two-Dimensional
Three-Dimensional
Interior
Exterior
Perimeter

ILLUSTRATION: Philip Johnson House, New Canaan Connecticut, 1949, Philip Johnson. Structural steel and glass.









building with a box

2.0

4.0

6

Relating two-dimensional planning to three-dimensional realities is an important aspect of architectural design. Initial designs are usually produced in two-dimensional drawings while later models and finally the actual structure will be created in three dimensions.

This activity is designed to familiarize the student with both two and three-dimensional concepts, and to allow them to gain experience in translating from one to another.

ACTIVITY

Define two and three dimensions for your students stressing that a dimension is simply a measurement. In two-dimensional works we can only measure length and width, while in three-dimensional work we can also measure depth. Following the discussion, they will select various photographs from resource magazines. These should be cut out leaving a wide margin around the desired image. These photographs are then glued to heavy paper, and when thoroughly dry the student will cut away all excess surrounding the image except at the bottom where a margin of approximately ½" should be left to form a base, which when bent back 90° may be used to attach the image to a base as illustrated. If this method proves to be difficult, a separate L-shaped tab may be constructed and attached to both the rear of the image and then to the base.

Additional activities utilizing this technique may involve discussion of size relationships, scale, and depth.

INFUSION SUBJECTS

ART SOCIAL STUDIES LANGUAGE ARTS MATH

RELATED ACTIVITIES

—Illustrate a story or activity utilizing this technique.

PEOPLE AND PLACES

Ernst Trova

VOCABULARY

Two-Dimensional
Three-Dimensional
Depth

another dimension

9.0

2.0

7

Architecture and its environment exist in three-dimensions. An architect must consider all sides of a structure in relation to the other sides as well as the structure's relation to its site. Traditionally, structures have very distinct front and rear features and uses. This is most evident in structures built as shelter.

This activity will provide reinforcement of structure as three-dimensional form, and as form with multiple sides and surrounding features.

ACTIVITY

After consideration of their homes and the areas which surround them, the students will draw both the front and rear elevations on the appropriate sides of a sheet of paper folded as shown. Next, using scrap construction paper they may make trees and other exterior details which can be attached to the base sections using L-shaped tabs affixed to both the rear of the item and then to the base. Color may also be added using crayons.

INFUSION SUBJECTS

ART LANGUAGE ARTS SOCIAL STUDIES

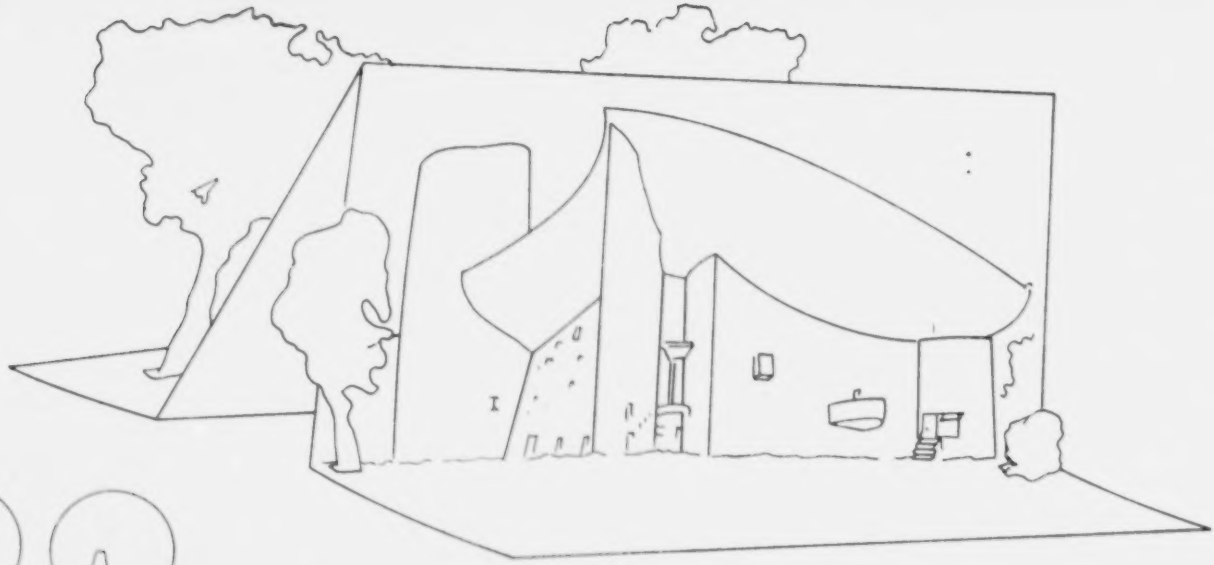
RELATED ACTIVITIES

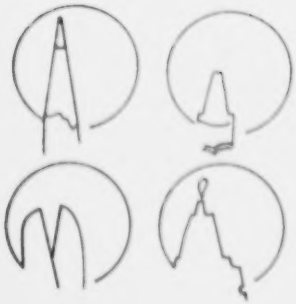
—Align the completed structures on a tabletop to form streets and towns.

VOCABULARY

Elevation

ILLUSTRATION: Notre Dame du Haut, Ronchamp, France, 1955, Le Corbusier. Concrete.





the city rises

10.0

8.0

8

Windows are our link with the outside environment while we occupy structures. In addition to the obvious requirements of providing light and ventilation, and relating to the activities intended to occur within, windows must also be visually attractive in regard to their placement on the exterior of the structure. The arrangement of glassed areas is called fenestration.

ACTIVITY

Windows come in virtually all shapes and sizes. After considering this and the outline of the house illustrated on their activity sheet, the student will draw windows on the view provided and then indicate the building's environment by drawing and coloring its surroundings.

INFUSION SUBJECTS

ART MATH LANGUAGE ARTS

RELATED ACTIVITIES

—Collect photographs of interesting uses of glassed area.

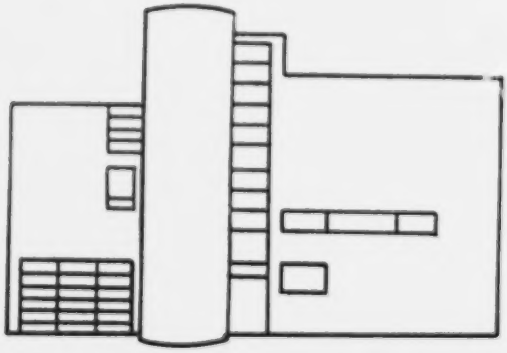
PEOPLE AND PLACES

Philip Johnson
Richard Meier
Mies van der Rohe

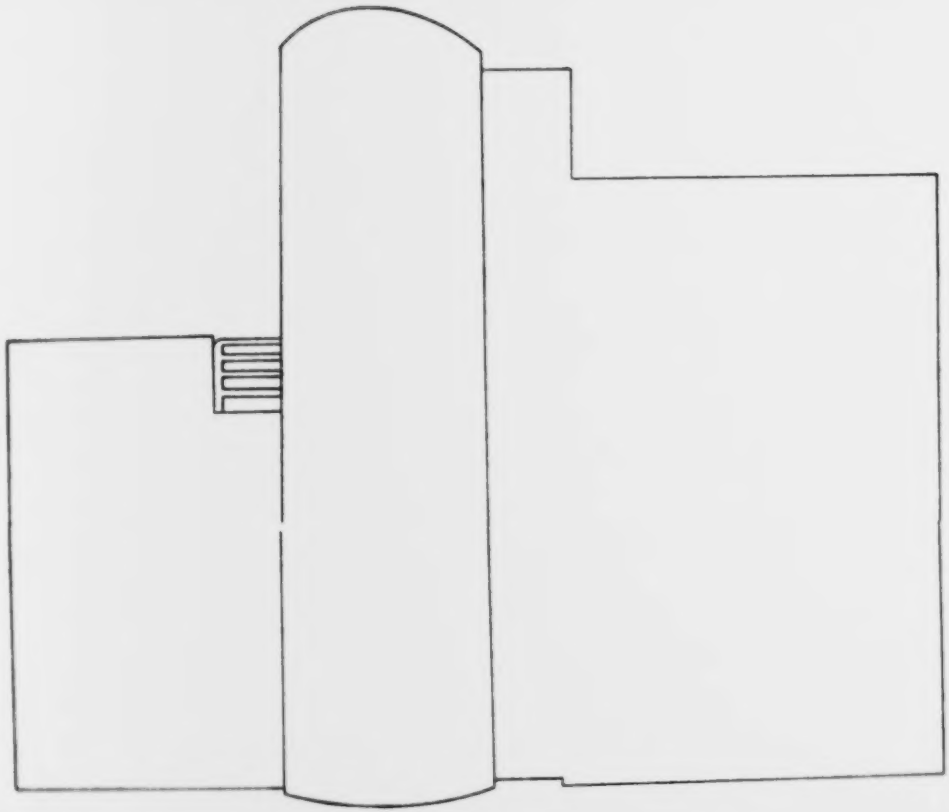
VOCABULARY

Fenestration

ILLUSTRATION: Private residence, 1983, Gwathmey Siegel & Associates. Wood frame.



glass
glass
glass?



7.0

2.0

9

Windows provide light, ventilation, and a visual link with the surrounding environment to the occupant within a structure. To do so efficiently they must be placed to relate to the activities carried out inside the building.

This activity will acquaint the student with the relationship of inside activity and window placement on a structure as well as reinforce the concept that a structure is a three-dimensional enclosure occupying and containing space.

ACTIVITY

On a sheet of paper folded in half as illustrated the student will **draw** the front of a building including four to ten windows and a door. Carefully using a utility knife, the instructor will cut three sides of the window allowing it to open and close. It is important to remember that the paper must be unfolded before cutting so that the back paper is not damaged. An old magazine will serve as a good base for cutting and provide protection for table surfaces. Following this procedure, the student can open each window and draw an illustration of an inside activity or occupant. If desired, the instructor may wish them to open the paper and illustrate interior details such as floors, stairs, and furnishings.

INFUSION SUBJECTS

ART LANGUAGE ARTS

RELATED ACTIVITIES

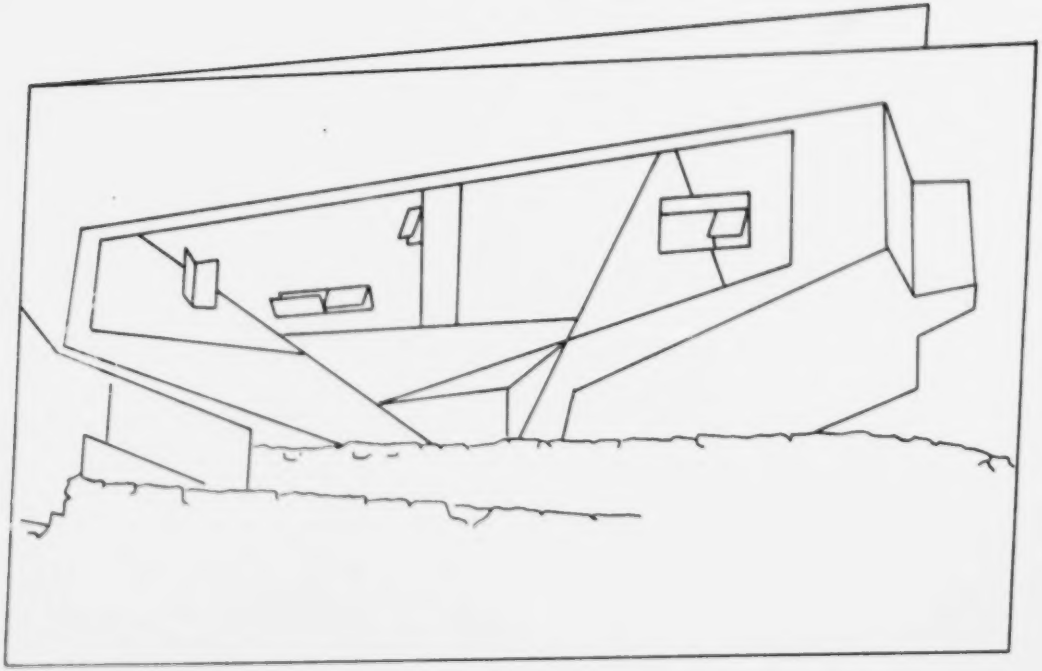
—Create a story which may be illustrated by revealing details behind the windows.

VOCABULARY

Fenestration

ILLUSTRATION: Lecture Hall, New York University, 1956-61, Marcel Breuer. Concrete.

a look inside



2.0

3.0

10

Although architectural structures are static, humans certainly are not. As a result of our movements we view our environment in bits and pieces as we move through or by it.

This activity is designed to acquaint the students with this concept by requiring them to attend to both the whole and to the details of which it is composed.

ACTIVITY

Following discussion of the concept, assign the students the task of planning a drawing depicting a scene that will represent an environment which they will imagine moving by or which they will imagine to move by them. The illustration on their activity sheet would be an example of the first; the space shuttle in orbit would be an example of the latter. Leaving a blank area of approximately 1" along one end of the paper, the student will draw and then color the environment they have imagined. Next, they will apply glue to the blank area and join it to the other end forming a cylinder. When the cylinder is revolved the environment will appear to pass by the spectator or vice versa.

INFUSION SUBJECTS

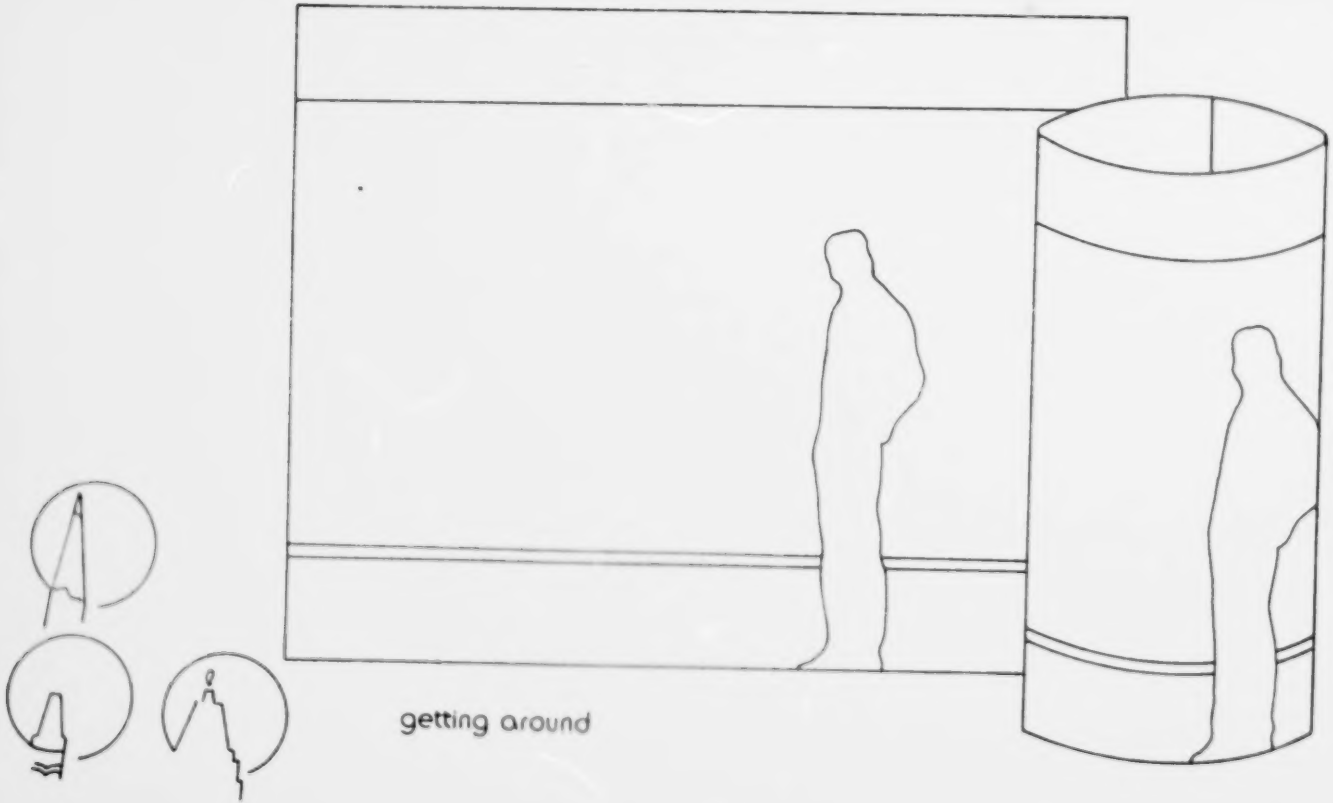
ART LANGUAGE ARTS SOCIAL STUDIES

RELATED ACTIVITIES

—Study the method by which the first motion pictures were produced.

VOCABULARY

Cylinder



getting around

7.0

2.0

11

We, and the structures we build and utilize, are surrounded by an environment which is constantly changing. An architect must be concerned with this environment, its various changes, and the effect those changes may have on the structure.

This activity will reinforce the concept that the environment has effect upon the structures we build just as the structures affect the environment, and that careful consideration and planning must be accomplished when designing a structure.

ACTIVITY

After discussing seasonal change and its possible effect on structures, especially those changes which are of a visual nature, the student will apply appropriate seasonal color to the illustration on the activity sheet.

INFUSION SUBJECTS

ART NATURAL SCIENCE LANGUAGE ARTS

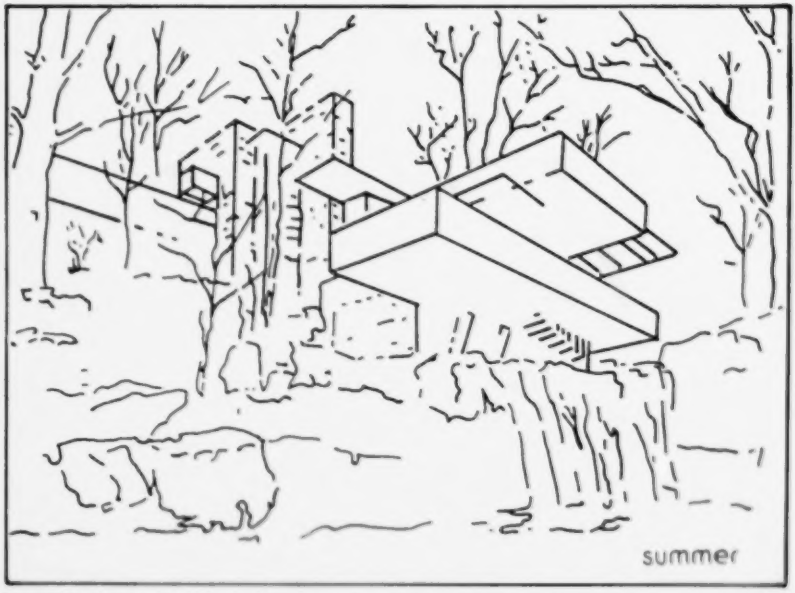
RELATED ACTIVITIES

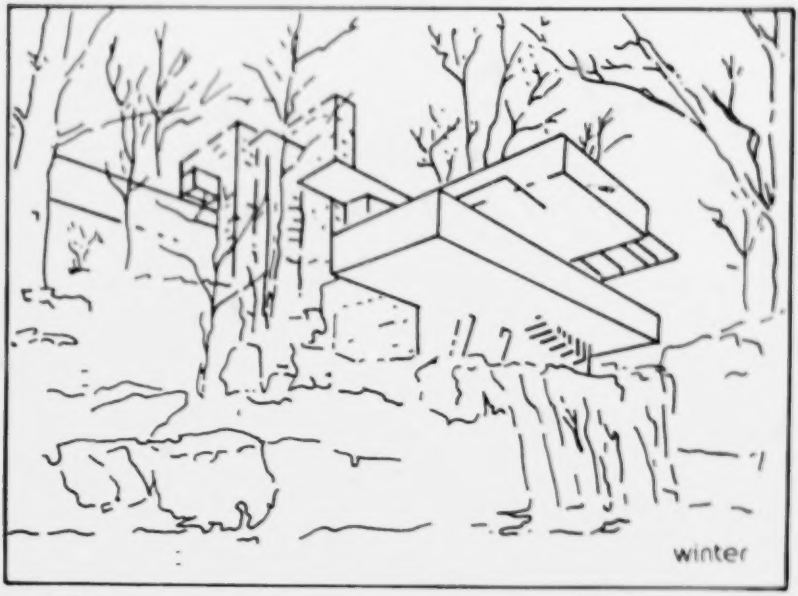
—Prepare seasonal drawings of the student's environment.

VOCABULARY

Environment
Seasonal

ILLUSTRATION: Kaufmann House, "Falling Water", Bear Run, PA, 1936, Frank Lloyd Wright. Concrete and stone.


summer


winter

1.0

2.0

12

Nature provides an endless variety of solutions to its own architectural problems. Most are designs perfected through thousands of years of adaptation and selection. With the development of building materials such as reinforced concrete, structural steel, and synthetics, architects have been freed from many of the restrictions of form and structure imposed by older, more conventional materials, typically stone and wood. Often referring to nature for insight, inspiration, and solutions to their design problems, they have created structures which are not only similar to those occurring in the natural environment, but also both functional and visually pleasing.

In making comparison of natural and built form the student should gain new insight into the parallels between the built and the natural environment.

ACTIVITY

After discussing the concept and the two examples illustrated, assign a study of the variety of architectural designs produced by architects, especially those of this century. Magazines and architectural texts will be their resource tools. Their task will be to identify structures which resemble natural forms. A parallel, or additional activity, could involve a study of natural history books and speculate which animal homes resemble, or might be adapted, to human structures.

INFUSION SUBJECTS

ART NATURAL SCIENCE LANGUAGE ARTS

RELATED ACTIVITIES

—Using clay, produce related natural forms and possible architectural designs.

—Assemble a scrapbook of related and architectural forms.

PEOPLE AND PLACES

Alvar Aalto
Pier Luigi Nervi
Eero Saarinen

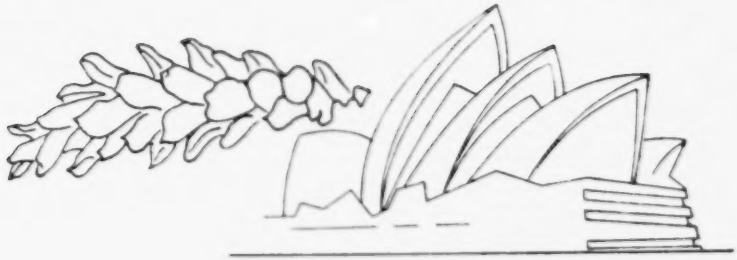
VOCABULARY

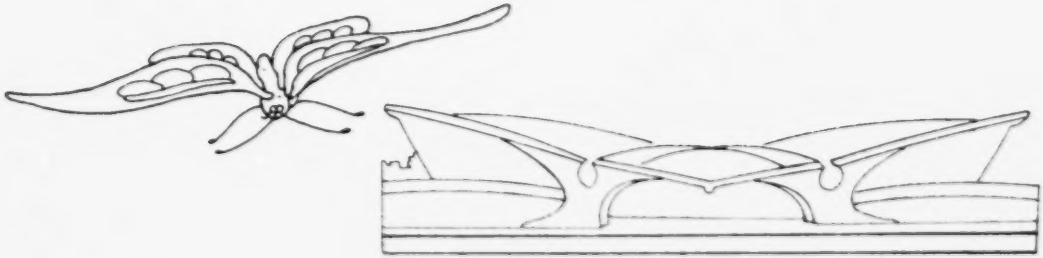
Shell
Reinforced
Concrete

UPPER ILLUSTRATION: Sydney Opera, 1957-73, Jorn Utzon. Concrete Shell.

LOWER ILLUSTRATION: TWA terminal, Kennedy Airport, 1956-62, Eero Saarinen & Associates. Concrete Shell.

building as nature builds





b

2.0

10.0

13

Pattern, the repetition of designed *motif*, is an element of design prevalent in both the natural and built environment. Nature may utilize pattern as in an animal's protective camouflage while a designer may use it as decoration. Wherever and however it is found, pattern lends visual interest to our environment.

This activity will acquaint the student with the concept of pattern, allow for experience in the recognition of its various uses, and expression through the creation of unique pattern designs.

ACTIVITY

On a small sheet of paper the students will create their design motif. This may be abstract or a depiction of an item from their own experience (e.g. rainbow, footballs, etc.). Encourage them to draw with a heavy outline. By overlaying a large sheet of paper, through which their design can be seen, they can, by repeatedly tracing the design, create their own visual pattern.

INFUSION SUBJECTS

ART MATH SCIENCE

RELATED ACTIVITIES

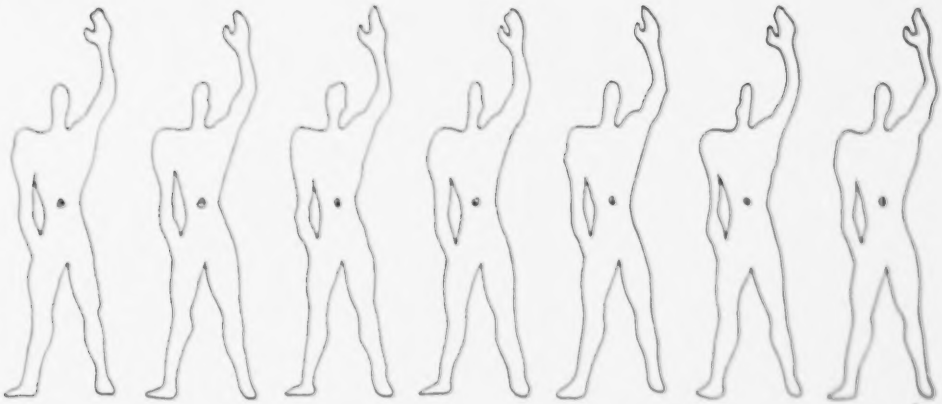
—Assemble a collection of various natural pattern from the environment.

—Assemble a collection of created pattern such as wallpaper, etc.

VOCABULARY

Motif
Pattern

ILLUSTRATION: Modular figure by Le Corbusier.



building with pattern

2.0

8.0

14

Architects often design with materials which are pleasant to touch as well as being visual and functional. Texture, the way something feels, is an element of design found virtually everywhere. Where it does not occur naturally it can quite often be found synthetically reproduced.

This activity will introduce texture as a design element, and acquaint the student to the possibilities of utilizing it visually.

ACTIVITY

Following discussion of texture, the student will place their worksheets over surfaces exhibiting obvious texture and rub a pencil-point lightly over the surface of the paper. Caution them to contain their pencil use to the space within the small rectangles, and especially to confine their pencil to the worksheet itself. This rubbing will reproduce the visual quality of the texture, and in some cases the tactile qualities as well. Using the brick pattern for organization they may wish to group the textures according to natural or synthetic.

INFUSION SUBJECTS

ART NATURAL SCIENCE LANGUAGE ARTS

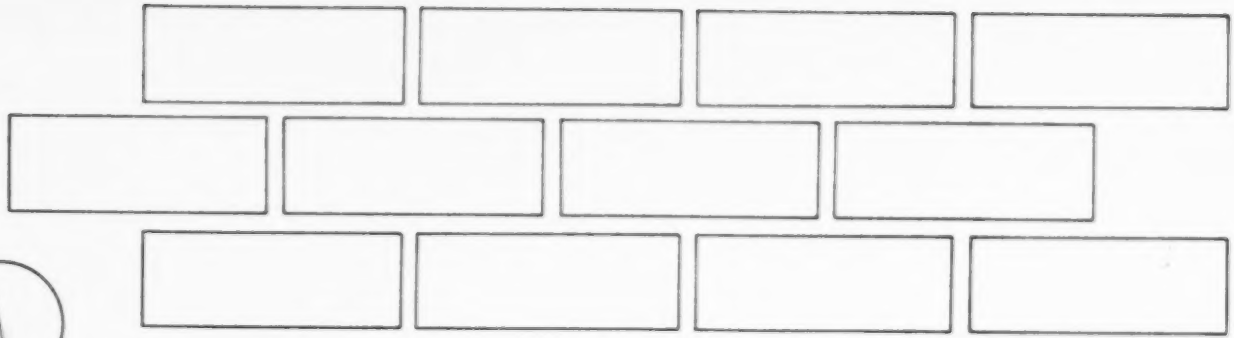
RELATED ACTIVITIES

—After creating a drawing or design apply texture rubbings to selected areas.

VOCABULARY

Synthetic
Tactile
Texture

ILLUSTRATION: "Coursed" brick pattern.



building with texture

10.0

4.0

15

The use of color in architecture goes far beyond the decorative. It can be utilized to stimulate emotional responses or to visually alter a space.

This activity is designed to introduce or reinforce basic color theory and to provide an inexpensive, yet efficient, means of color application in student work.

ACTIVITY

The student will collect colored areas cut with scissors from magazine advertisements and illustrations. The initial activity is limited to the student applying the appropriate color clipping to the labeled areas of the worksheet creating a color-wheel. The instructor may further wish the student to identify and construct color schemes and designs. These clippings may also be collected and utilized to apply color to other creations.

INFUSION SUBJECTS

ART SCIENCE LANGUAGE ARTS

RELATED ACTIVITIES

—Study and relate various colors to emotional responses.
—Study the effects of visually altering space utilizing color.

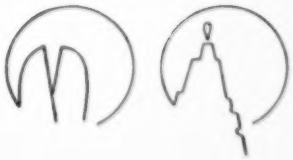
PEOPLE AND PLACES

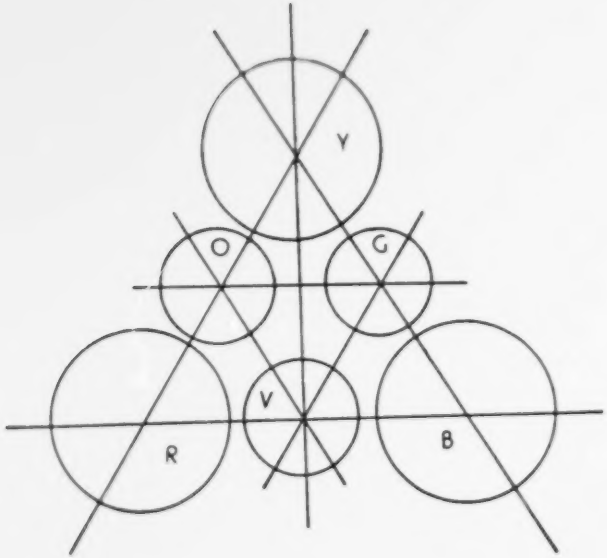
Luis Baragan
Josef Albers

VOCABULARY

Color Wheel
Primary Color
Secondary Color

building with color





7.0

8.0

16

In addition to the creation of new materials technology is constantly providing new methods of utilizing existing materials. Many, when altered, or combined with other materials, acquire properties far beyond those possessed in their original state. For example, when folded as illustrated, ordinary paper acquires the additional strength to stand unsupported and the ability to support a load.

ACTIVITY

Demonstrate that a sheet of paper can neither stand alone, nor can it support a load such as a pencil. After folding as illustrated however, it can do both. Encourage the students to explore the design possibilities of folded paper.

INFUSION SUBJECTS

ART SCIENCE MATH

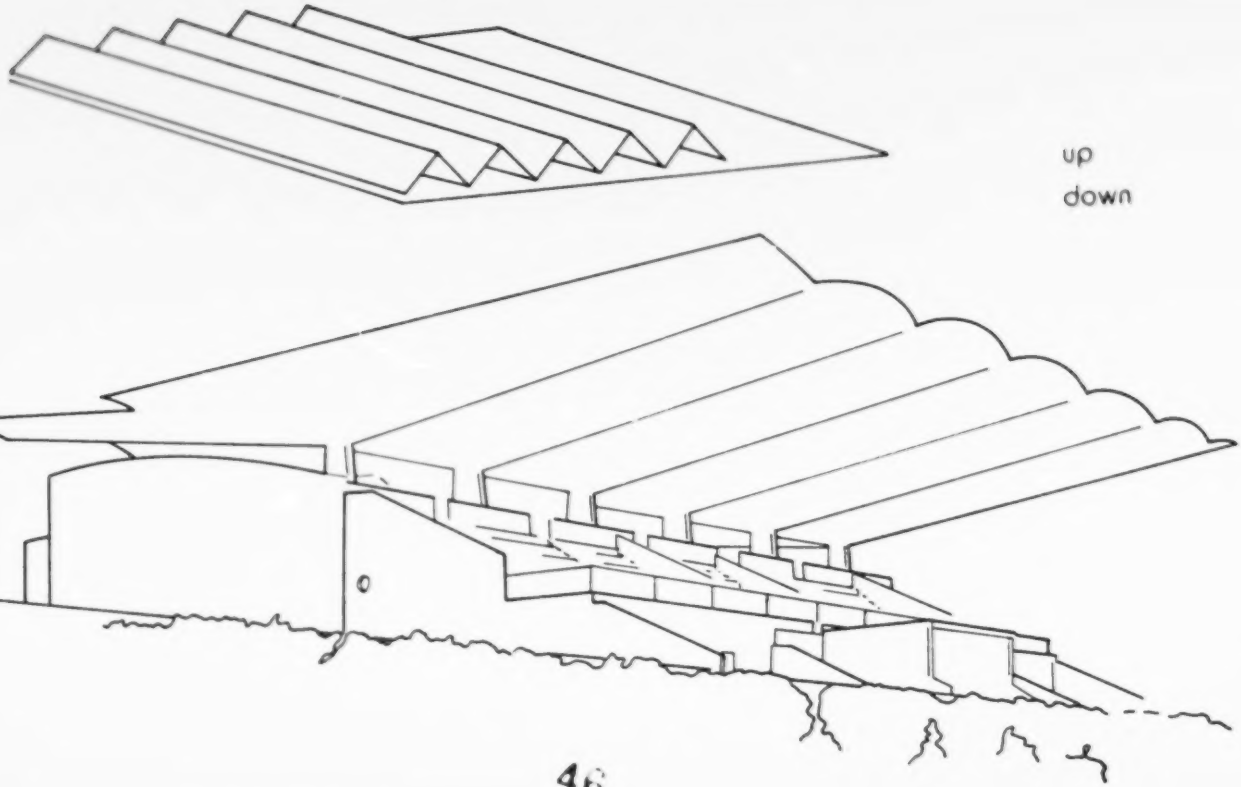
RELATED ACTIVITIES

—Build model structures utilizing folded paper.
—Explore other possible ways of increasing the strength of paper.

VOCABULARY

Corrugated

ILLUSTRATION: Grandstand at Zarzuela Race Track, Madrid, 1935, Eduardo Torroja. Concrete.


up
down

9.0

8.0

17

As the world population has soared along with construction costs, architects have sought to provide inexpensive, functional, and rapidly produced shelter. One solution—modular structures composed of virtually identical, and in most cases, prefabricated units. These structures can be rapidly produced, usually at lower cost than with traditional building methods, and are easily adaptable to various needs and environments. Many contain built-in features such as storage or seating; some even have plumbing and fixtures in place ready for connection following unit assembly.

ACTIVITY

Assemble a collection of identical cartons or storage units. Each student will be responsible for the creation of a simulated environment inside the unit as well as decorating the exterior. Explain however, that most modular units are externally identical or have only minor variations in appearance such as window placement. This serves to unify the external design of the structure. Individual expression is usually, although not necessarily, limited to internal design details. Assemble the units to create an environmental complex. Experiment with various methods of stacking, and connecting.

INFUSION SUBJECTS

ART MATH SOCIAL STUDIES

RELATED ACTIVITIES

—Create environmental complexes of several structures.
—Study environmental/social planning.
—Study modular construction.

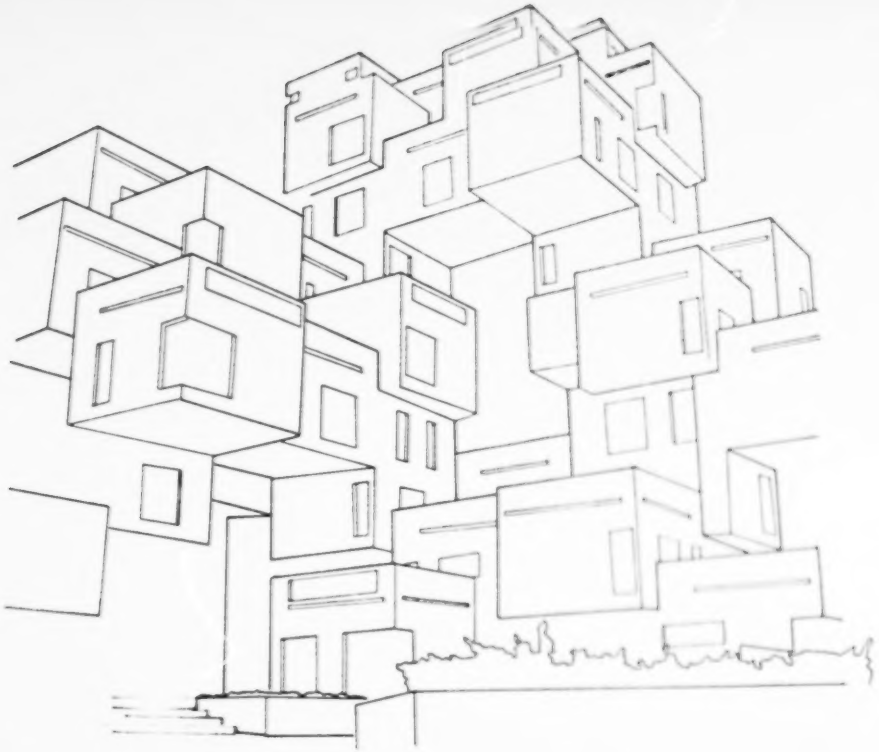
PEOPLE AND PLACES

Kurokawa
Moshe Sadfie
Paolo Soleri

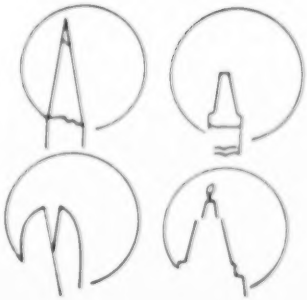
VOCABULARY

Modular
Unit
Complex

ILLUSTRATION: Habitat '67, Montreal, 1966-67, Moshe Sadfie. Prefabricated concrete boxes.



the module



6.0

1.0

18

Cities may be considered to be collections of architecture. Many large cities have representative structures designed by numerous renowned architects. Although visiting these cities and their structures may be impossible, an exposure to both may be accomplished by collecting and studying photographs or postcards representing buildings and their locations. Further, cultural differences may be observed as well as the unique responses of the various architects to the environment.

ACTIVITY

Assemble a collection of photographs or postcards depicting structures located in specific cities. Obtain maps of these cities and create a display with both.

INFUSION SUBJECTS

ART SOCIAL STUDIES LANGUAGE ARTS MATH

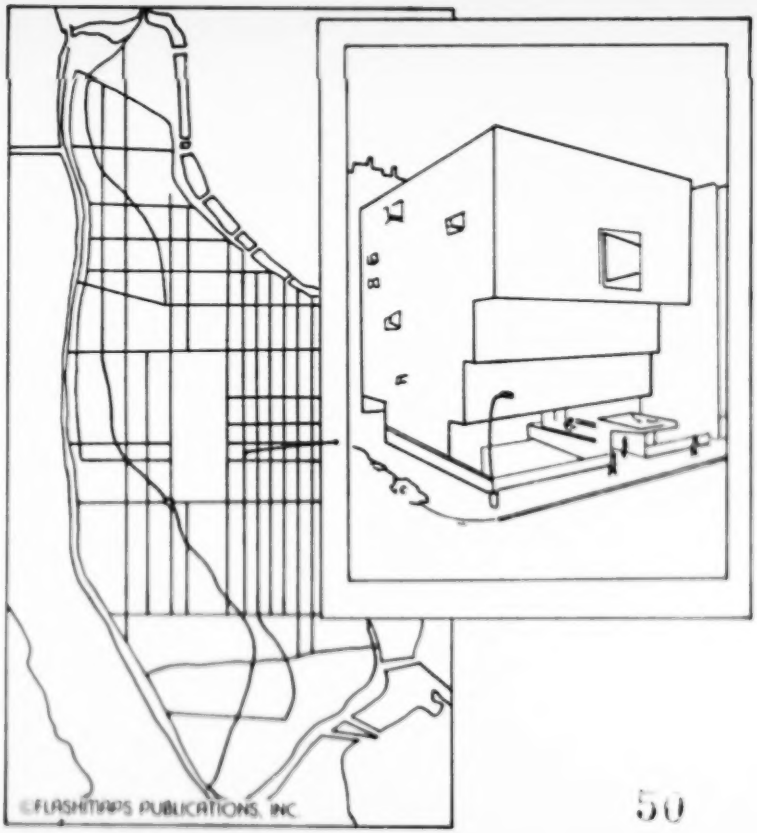
RELATED ACTIVITIES

—Collect maps and study the various layouts of the cities.

VOCABULARY

Cultural Differences
Town Planning

ILLUSTRATION: Whitney Museum of American Art, New York, 1966, Marcel Breuer.



wish you were here!

6.0

2.0

19

Although the purpose of architecture, to provide shelter, remains constant throughout the world, the method of achieving it is far from universal. The reasons for this variation may be climatic or cultural.

The technological advances of this century coupled with the efficient communication of ideas has unified the process of architectural design substantially. Still, many landmarks of construction unique to the countries of their origin remain as a visible historical record.

This activity is designed to acquaint the student with the historical aspects of architecture and to allow them to gain exposure and an appreciation of cultural differences.

ACTIVITY

Assign students to research the countries listed on the activity sheet. Their goal is to identify the structure illustrated which has its origin in the country they are exploring. The students will then print the country of origin in the space provided beside the appropriate structure.

INFUSION SUBJECTS

ART SOCIAL STUDIES LANGUAGE ARTS

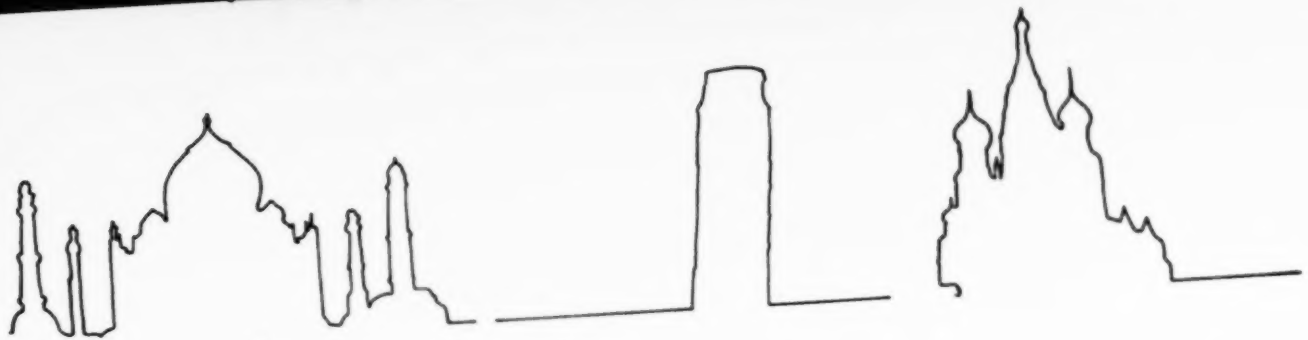
RELATED ACTIVITIES

—Establish a time-line for the illustrated structures.
—Identify important structures and methods of construction which appeared before, during, or after the time of the illustrated structures.

VOCABULARY

Cultural

ILLUSTRATIONS: Top line, left to right: Taj Mahal, India; Tower of Pisa, Italy; St. Basil's, Russia. Line two: Eiffel Tower, France; Giza Pyramids, Egypt. Line three: Stonehenge, England.



where and when?

EGYPT
ITALY
FRANCE
INDIA
ENGLAND
RUSSIA

b

1.0

2.0

20

One problem-solving situation facing architects is how to end or "top" their structures. This decision is not always made as the result of climatic or structural requirements, and may be purely an aesthetic consideration.

ACTIVITY

Illustrated are the tops of three recent structures built in New York City. Discuss the visual impact of each and possible explanations for their appearance. For example, the center structure was designed to accommodate the installation of solar panels on its angled surface. In the space provided the students may draw the tops of various structures located in their immediate environment.

INFUSION SUBJECTS

ART LANGUAGE ARTS SCIENCE

RELATED ACTIVITIES

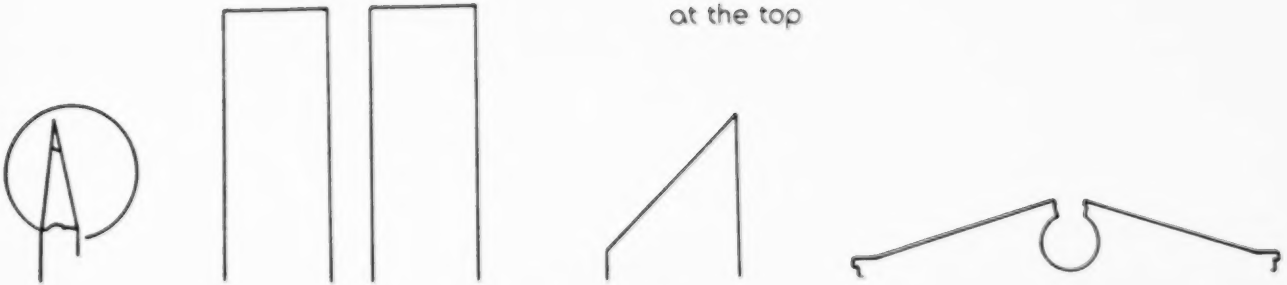
—Assemble a collection of the outlines of structures and create an identification game with them.

VOCABULARY

Pitch
Visual Impact

ILLUSTRATIONS: World Trade Center, Minoru Yamasaki; Citicorp Center, Hugh Stubbins; AT&T Building, Philip Johnson and John Burgee.

at the top



7.0

2.0

21

When the American architect Louis Sullivan stated near the turn of the century that 'Form follows function', he introduced both a topic for ongoing debate and a new outlook in architecture regarding the relationship between a structure and its intended use. His structures were devoid of the ornamentation which had become an essential architectural feature and returned architecture to a purer structural form more representative of function and the technology and materials utilized in construction. Although there have been strong attempts to return to a more ornamental architecture, throughout this century architects and designers have continued to follow the idea that function, rather than aesthetics, dictates form.

In making comparison of the various forms and functions of structures the student will gain new insight into the nature of building and the personalities of architects.

ACTIVITY

After a discussion of the concept and the illustration, a cathedral whose uplifted shape forms a cross, assign a study of the variety of architectural designs produced by architects. Magazines and architectural texts will be their resource tools. Their task will be to identify structures whose forms relate directly to their function, and those which do not.

INFUSION SUBJECTS

ART LANGUAGE ARTS SOCIAL STUDIES
NATURAL SCIENCE

RELATED ACTIVITIES

—Assemble a display of related architectural form and function.
—Research natural forms exhibiting a form and function relationship.

PEOPLE AND PLACES

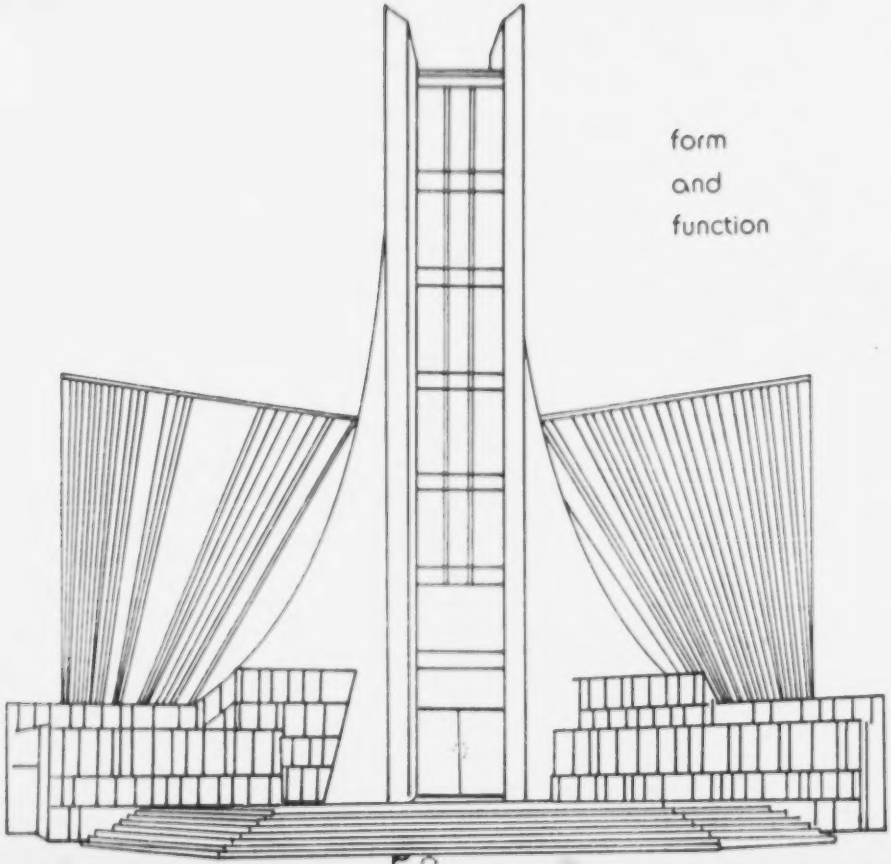
Louis Sullivan
Frank Lloyd Wright
Mies van der Rohe
LeCorbusier

VOCABULARY

Form
Function

ILLUSTRATION: St. Mary's Cathedral, Tokyo, Japan, 1962-65, Kenzo Tange.

form
and
function



b

8.0

1.0

22

Although the earliest structures were built utilizing only natural materials such as wood and stone, today's architecture may be constructed entirely of synthetics. Many synthetic building materials simulate natural materials visually yet possess strength and durability far beyond those of the originals. Modern science and technology continues to provide architects with an expanding number of new materials and construction possibilities. Although the new methods are popular, architects continue to use natural materials because of the warmth and beauty they impart to a structure.

This activity will acquaint the student with both natural and synthetic materials and construction techniques, the similarities and differences of such materials, and an appreciation for the qualities of both.

ACTIVITY

The illustration depicts architectural symbols for the most widely utilized natural and synthetic construction materials. Following a discussion of the terms natural and synthetic assign the students the task of identifying the materials found within the classroom and classifying them according to use and natural or synthetic. Discuss the similarities and differences of both. You may wish to continue an activity by assigning the students to collect samples of construction materials, or to pursue further research into the nature and composition of the materials.

INFUSION SUBJECTS

ART NATURAL SCIENCE

RELATED ACTIVITIES

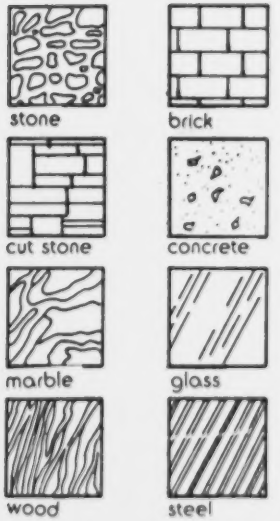
—Locate and reproduce architectural symbols for additional materials.

—Collect and classify texture rubbings of natural and synthetic materials.

VOCABULARY

Natural
Synthetic
Materials
Simulate

natural synthetic



10.0

2.0

23

A large portion of modern architecture derives form and structure from grids composed of pure geometric shapes. Structures designed with repetitive shapes and utilizing materials of architecture of a free-form nature.

This activity is designed to reinforce the student's awareness of the importance of shape within the structure of the environment, and provide new insight into the possiblities of creating with pure shape.

ACTIVITY

Following a discussion of the illustration which depicts two examples of architectural space created with pure geometrical shapes, assign the students the task of identifying other applications of geometric grids in their environment.

INFUSION SUBJECTS

ART MATH NATURAL SCIENCE

RELATED ACTIVITIES

—Prepare drawings of possible structures based upon grids composed of basic shapes.
—Collect photographs of structures utilizing geometric grids.
—Compute the areas of basic shapes.
—Construct three-dimensional models of geometric solids.

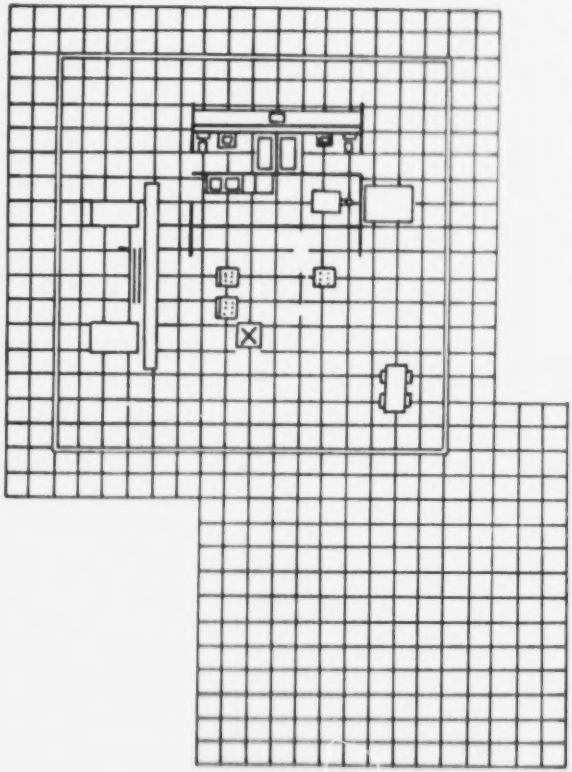
PEOPLE AND PLACES

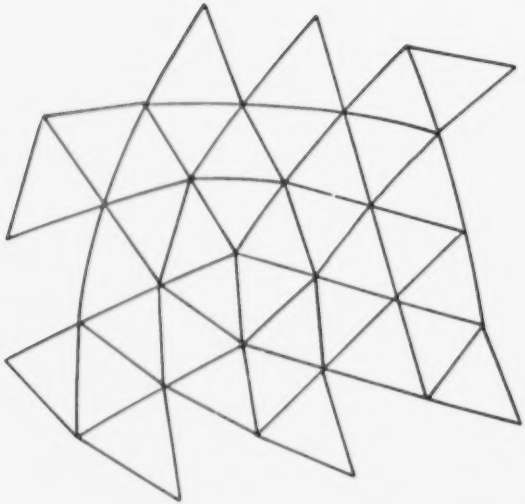
Mies van der Rohe
R. Buckminster Fuller
Richard Meier
Alvar Aalto
Frank Lloyd Wright

VOCABULARY

Grid
Geometric
Component
Area
Repetitive

ILLUSTRATION: (Left) Fifty by Fifty-Foot House, 1950-51, Mies van der Rohe
(Right) Ford Rotunda (Segment), Detroit, Michigan, 1953, R. Buckminster Fuller.





building with shape

9.0

6.0

24

For centuries the tent has provided efficient, mobile shelter; an integral part of daily life for many cultures. Today, the tent, once considered to be only temporary structure, has undergone changes in material and structure and evolved into a uniquely flexible form of architecture. Relatively inexpensive and exhibiting remarkable versatility in shape and size, the tent is emerging as an important structural form utilized by creative architects around the world.

This activity will reinforce and enlarge the student's concepts of this form of flexible space by providing an opportunity for exploration and experimentation.

ACTIVITY

Following a discussion of the cultures which have, and do, utilize tents as shelter, the student may experiment with various materials such as paper and fabric, and different types and methods of support to create flexible space. If the physical education department of your school has a parachute you may experiment on a large scale, allowing the students to form an internal supporting structure with their bodies, brooms, poles, metersticks, and other extensions.

INFUSION SUBJECTS

ART SOCIAL STUDIES LANGUAGE ARTS

RELATED ACTIVITIES

—Create a display utilizing photographs and models of historical and contemporary tents.
—Research computer-generated graphics which resemble flexible three-dimensional spaces.

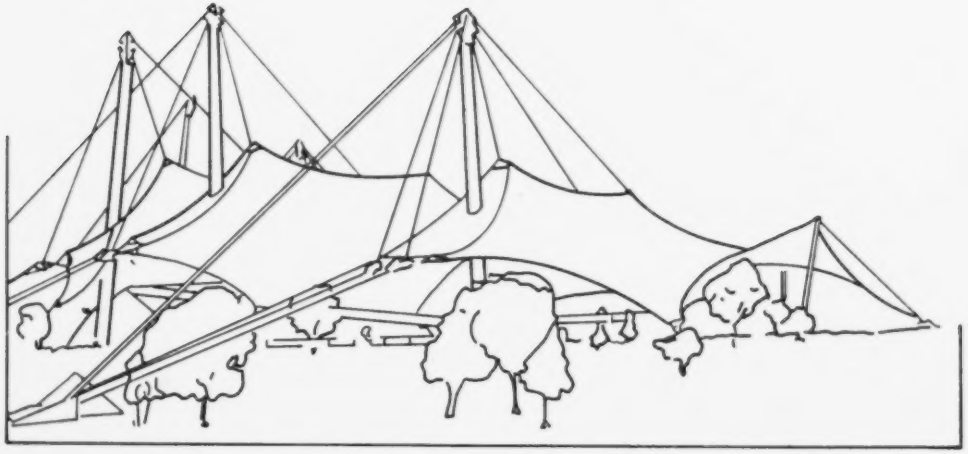
PEOPLE AND PLACES

Frei Otto
Felix Candela
Kenzo Tange

VOCABULARY

Suspension
Tension
Support
Mast
Space Frame

ILLUSTRATION: Olympic Stadium, Munich, Germany, 1972, Frei Otto



the big top

3.0

10.0

25

Communication is the primary function of architectural design prior to, and during construction. Although drawing skills are obviously important, verbal skills are also required to communicate with others. The vocabulary of the architect changes as new technology and materials replace the old, and just as the design skills must continue to change and improve, so must the knowledge of terminology and verbal skillls improve.

This activity is designed to acquaint the student with the basic vocabulary of architecture.

ACTIVITY

The illustration contains word-search puzzles of various difficulty levels. After a discussion of the relationship and interdependence of graphic and verbal skills, assign students specific puzzles, or all, depending upon their reading level. Following the activity, discuss the terminology, its importance, and, if necessary, assign additional research utilizing dictionary and text resources.

INFUSION SUBJECTS

LANGUAGE ARTS SOCIAL STUDIES ART

RELATED ACTIVITIES

—Create additional word-search puzzles.
—Locate vocabulary words as they appear in magazines and architectural texts.

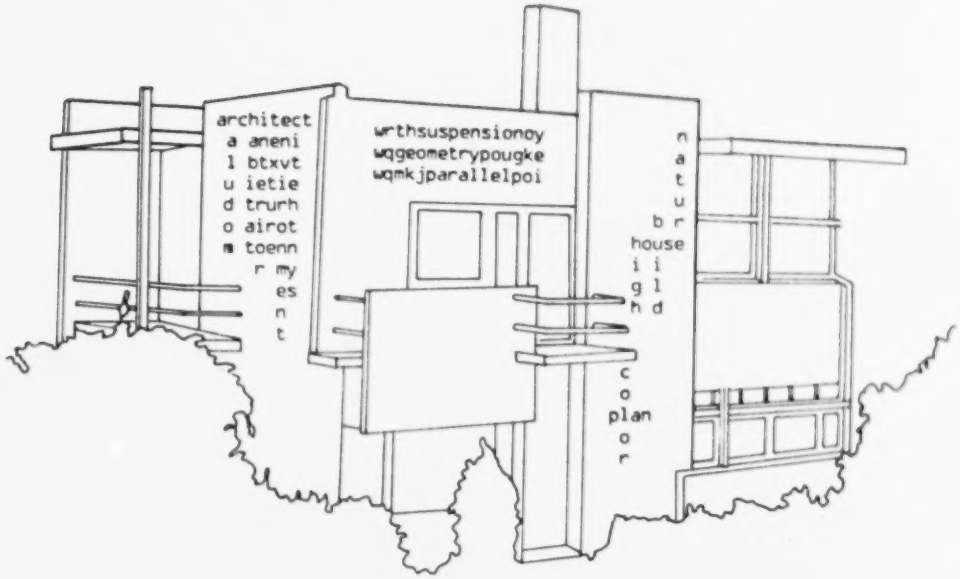
VOCABULARY

Vocabulary
Terminology
Communication

ILLUSTRATION: Schröder House, Utrecht, 1924, Gerrit Rietveld.

PUZZLE KEY (L to R)

architect modular habitat interior texture
environment synthetic
suspension geometry parallel
color plan
high house build nature



building vocabulary

3.0

5.0

26

The structure and appearance of a building often undergo alteration during the design and construction phases. To observe the effect such change will impart on a building an architect or designer will often employ tracing paper overlays. Drawings executed on tracing paper may be placed, one upon another, allowing each drawing to show through. This allows the architect to study the relationship of the structure with each proposed change without necessitating the completion of a revised drawing for each possible alteration. Drawings may also be prepared to indicate the addition of landscaping, later alteration, or even the visual effect of people around the architectural space.

This activity will reinforce the student's awareness of the importance of careful planning, and will provide them with an opportunity to explore a drawing technique which can communicate change and movement.

ACTIVITY

The illustration depicts three separate drawings executed on tracing paper and placed, one upon another. The first drawing is of a basic structure which will remain static while the second, of an aircraft, and the third, of an individual, are placed overtop and perhaps moved across. After a discussion of the concept and technique, the students will produce their own drawings of the structures over which they may apply and/or move additional drawings.

INFUSION SUBJECTS

ART LANGUAGE ARTS SOCIAL STUDIES

RELATED ACTIVITIES

—Discuss the techniques utilized to produce animated films with acetate overlays.
—Write and produce animated stories.

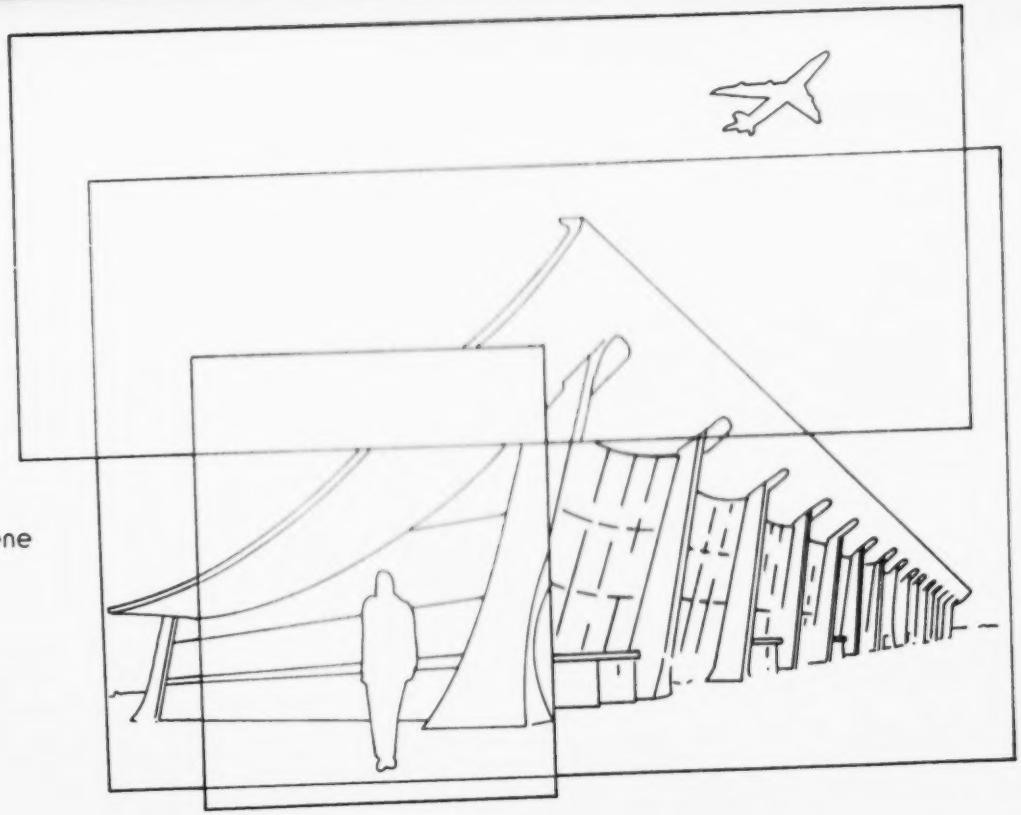
PEOPLE AND PLACES

Walt Disney

VOCABULARY

Tracing Paper
Overlay
Animated Cell

ILLUSTRATION: Dulles Airport Terminal, Chantilly, Virginia, 1958-62, Eero Saarinen.



a change of scene

2.0

3.0

27

Perspective is both a visual phenomenon and a graphic tool for portraying a structure in three-dimensions when limited to the use of only two. While the skills necessary to execute and utilize this drawing technique may be outside those possessed by your students, the concept, and the ability to demonstrate it, are easily accessible.

This activity is designed to demonstrate to students the visual phenomenon of perspective, and the graphic method of depicting it.

ACTIVITY

Discuss the visual phenomenon of perspective, and its appearance within the environment of the student, citing examples such as streets and railroad tracks which seem to narrow as they recede into the distance. Demonstrate on the illustration, drawn from an actual photograph, how lines which in reality are parallel converge to a single point. Select similar photos of structures with parallel features, and using straightedge draw the perspective lines as indicated in the illustration.

INFUSION SUBJECTS

ART MATH SCIENCE

RELATED ACTIVITIES

—Distribute photocopies of similar photographs and allow students to line perspective.
—Draw structures simulating perspective.

VOCABULARY

Perspective
Illusion
Converge
Parallel
Two-Dimensional
Three-Dimensional

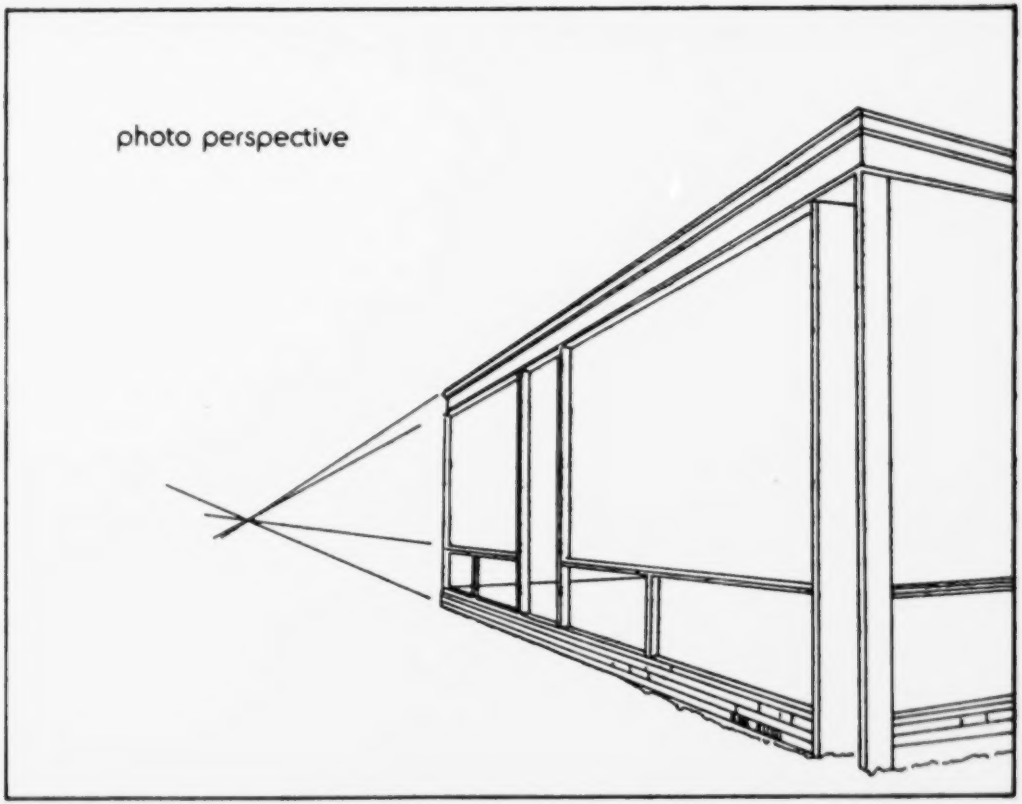


photo perspective

7.0

5.0

28

The ease with which humans will utilize and move through the space created by the architect and his building is an important consideration during the design phase of any structure. While most architects plan their designs around the projected traffic patterns, some choose to create spaces through which the occupants will be forced to find their own pathways. Obviously, the former is preferable as the latter can produce a structure which is virtually unusable. Most students are familiar with the puzzle form of the maze, and most have experienced difficulties in moving through some spaces. By creating a maze puzzle whose purpose is to impede progress, and by studying traffic flow around and through their environment, the student should become more aware of the nature and importance of planning.

ACTIVITY

After a discussion of the concept and an introduction to the maze puzzle, the student will create a maze on paper with an indicated starting and finishing point. They will then challenge other students to find the path through the maze. You may wish to assign students the task of obtaining other examples of the maze appearing in magazines or puzzle books prior to initiating the activity. Following the activity discuss the flow of traffic within the classroom and immediate environment and plan and diagram ways to alter or improve movement.

INFUSION SUBJECTS

ART MATH SOCIAL STUDIES

RELATED ACTIVITIES

—View Actual floorplans such as the illustration provided and indicate traffic flow.
—Study maps, determining how to "get there from here".

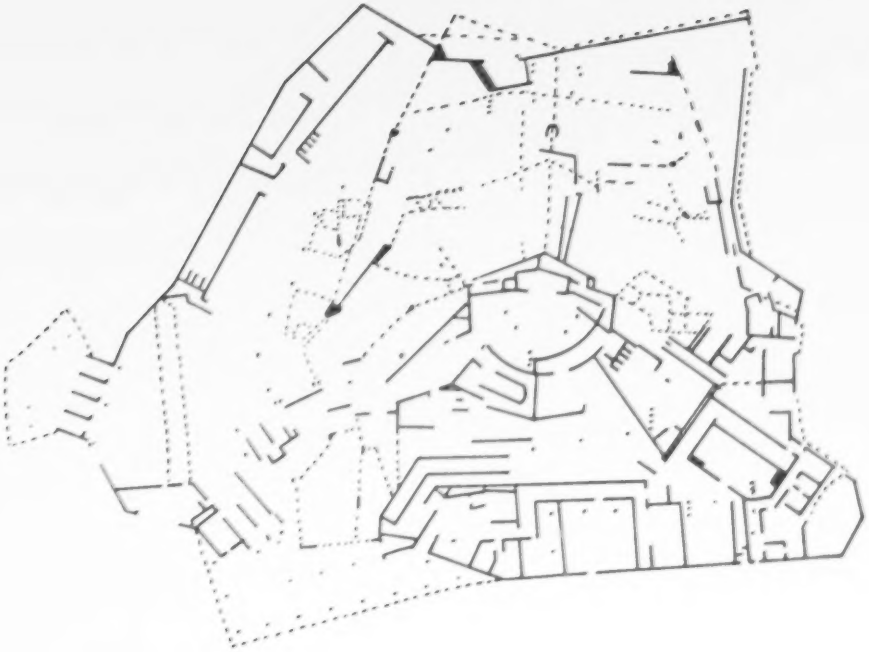
PEOPLE AND PLACES

Hans Scharoun
Mies van der Rohe
Philip Johnson
Bertrand Goldberg

VOCABULARY

Floorplan
Traffic

ILLUSTRATION: Concert Hall, Berlin, Germany, 1960-63, Hans Scharoun.



5.0

7.0

29

The floorplan is the architect's primary tool for communicating his design to clients, contractors, and construction personnel. While the architect utilizes the floorplan to design and build the space, an interior designer will use it to design and communicate the utilization of the space, and the placement of furniture, lighting, color, and accessories. Such plans are drawn to scale, enabling the designer to make exact measurements, plan the types of furniture to be utilized, and the placement and traffic flow around it.

This activity is designed to introduce the student to the concept of the floorplan, its necessity during the planning phase of a structure, and to allow an initial experience in creating with the plan.

ACTIVITY

Define the term floorplan for your students utilizing the illustration to demonstrate that the plan depicts the placement of walls, windows, and other structural components as seen from directly above. In the illustration an actual floorplan of both a solid and a glass wall are indicated. These two walls appear in the area to the far right within the upper axonometric drawing, an architectural illustration which indicates both the floorplan and the three-dimensional space it will create. Following a discussion of the illustration and the floorplan concept, the students will cut out the scale furniture drawings and experiment with various arrangements on the space created by the two walls. Both the walls and the furniture are drawn to a scale of ¼" = 1', the scale typically utilized by designers.

INFUSION SUBJECTS

ART MATH LANGUAGE ARTS

RELATED ACTIVITIES

—Obtain additional floorplans of the same scale and create furniture arrangements.
—Explore traffic flow possibilities and depict them using floorplans and scale furniture.
—Observe the immediate environment, the furniture arrangements, and resulting traffic flow.

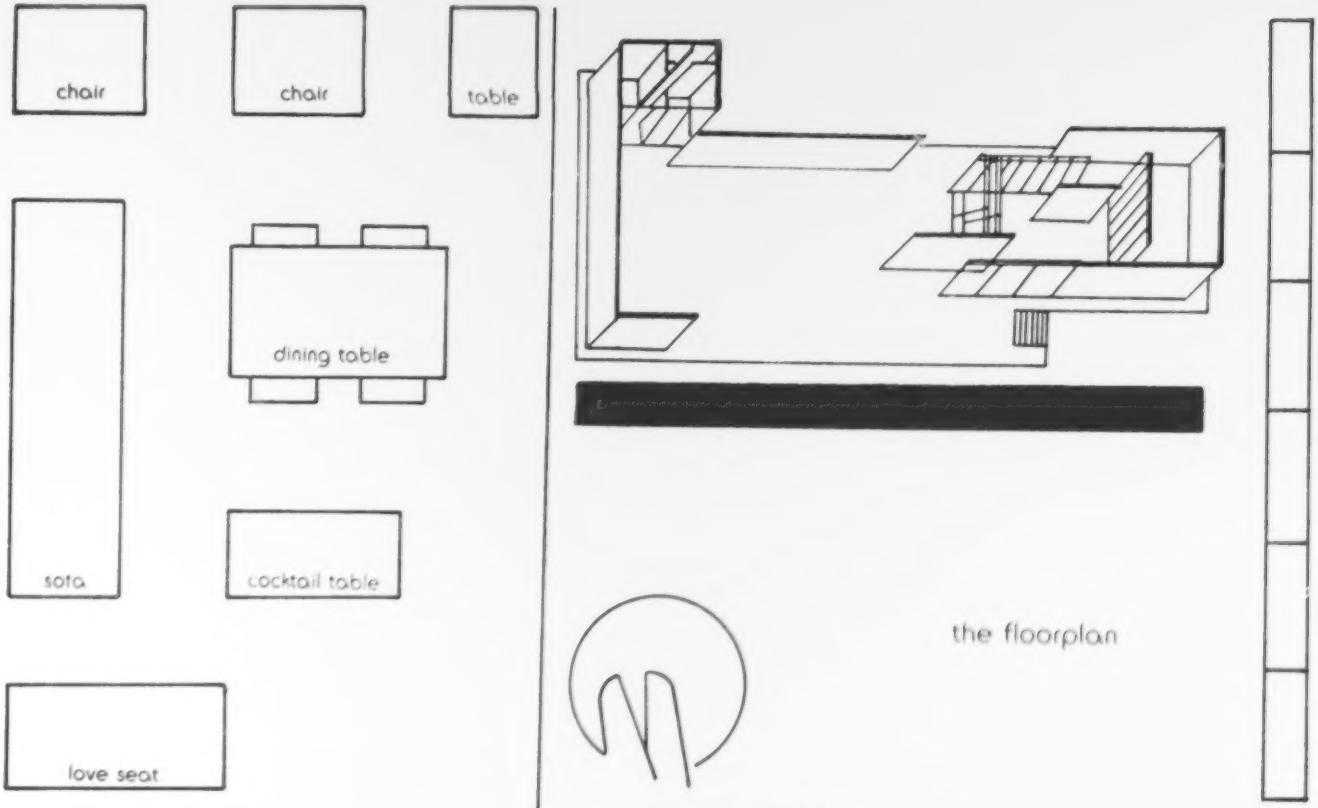
—PEOPLE AND PLACES (INTERIOR DESIGNERS)

Joe D'Urso
Angelo Donghia

PEOPLE AND PLACES (ARCHITECTS)

Charles Rennie Mackintosh
Hugh Newell Jacobsen

ILLUSTRATION: German Pavilion, International Exposition, Barcelona, 1929, Mies van der Rohe.



the floorplan

3.0

5.0

30

During the design and construction of a building, architects utilize scale drawings of the structure and its component parts where full size drawings are either impractical or impossible. For smaller structures a scale of ¼" = 1' is typical. Graph paper composed of ¼" square grid is an important tool of the architect or designer. With such paper quick sketches, or finished drawings, may be made accurately and easily to scale.

This activity will provide experience in the use of scale to represent larger forms graphicly and increase the understanding of the student regarding the use of plans and planning.

ACTIVITY

Following a discussion of the concept of scale and the use of scale drawings in design, distribute reproductions of the illustrated graph paper. The student will then plan, design, and draw a floorplan of either a structure of single room by blocking out areas for walls and allowing openings representing doors and windows as illustrated in Activity 29, or as exhibited by actual floorplans. Following completion of their drawings they may plan traffic flow and furniture arrangements utilizing the scale furniture cut-outs from Activity 29.

INFUSION SUBJECTS

ART MATH

RELATED ACTIVITIES

—View actual floorplans noting scale and the graphic representation of structural detail.

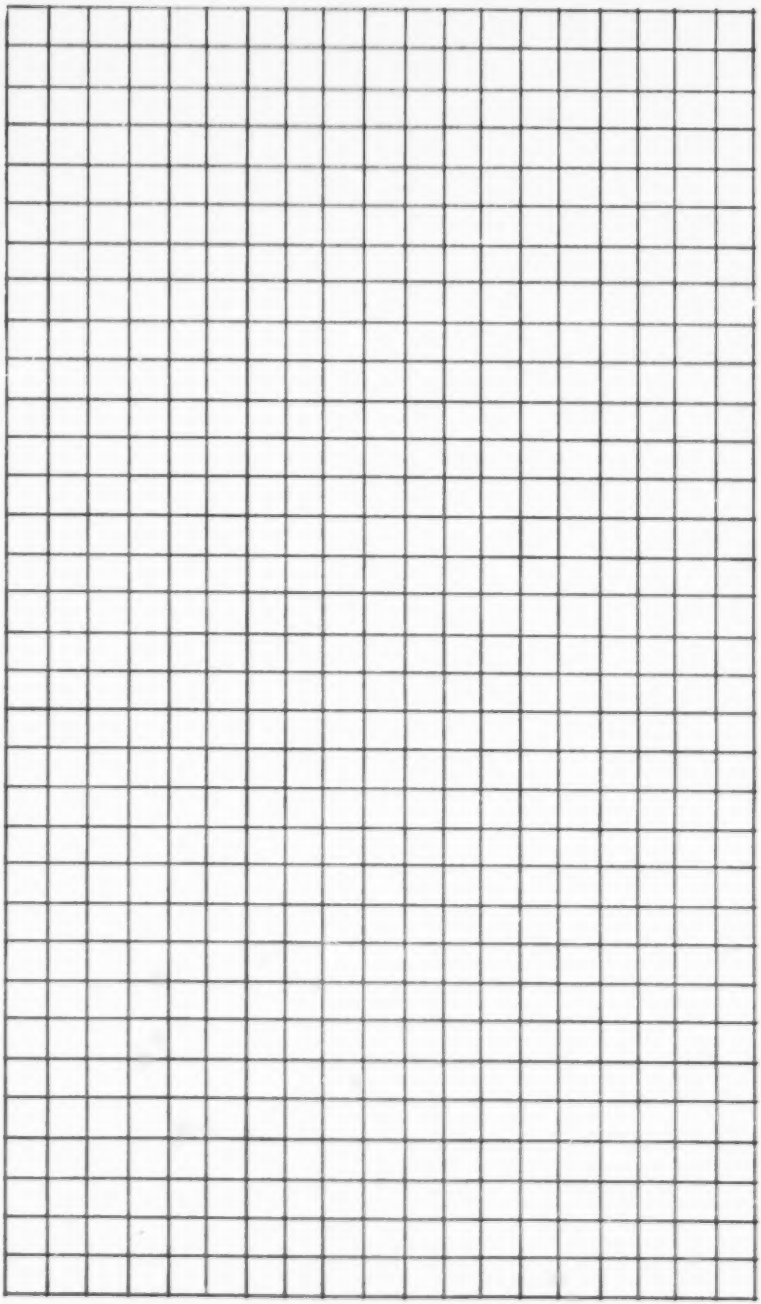
—Measure and graph the classroom or immediate environment.

—Utilizing the above, chart traffic flow and furniture arrangement planning alternatives.

—Compute the area of the classroom using scale drawings and determine usuable space.

VOCABULARY

Scale
Grid
Graph



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